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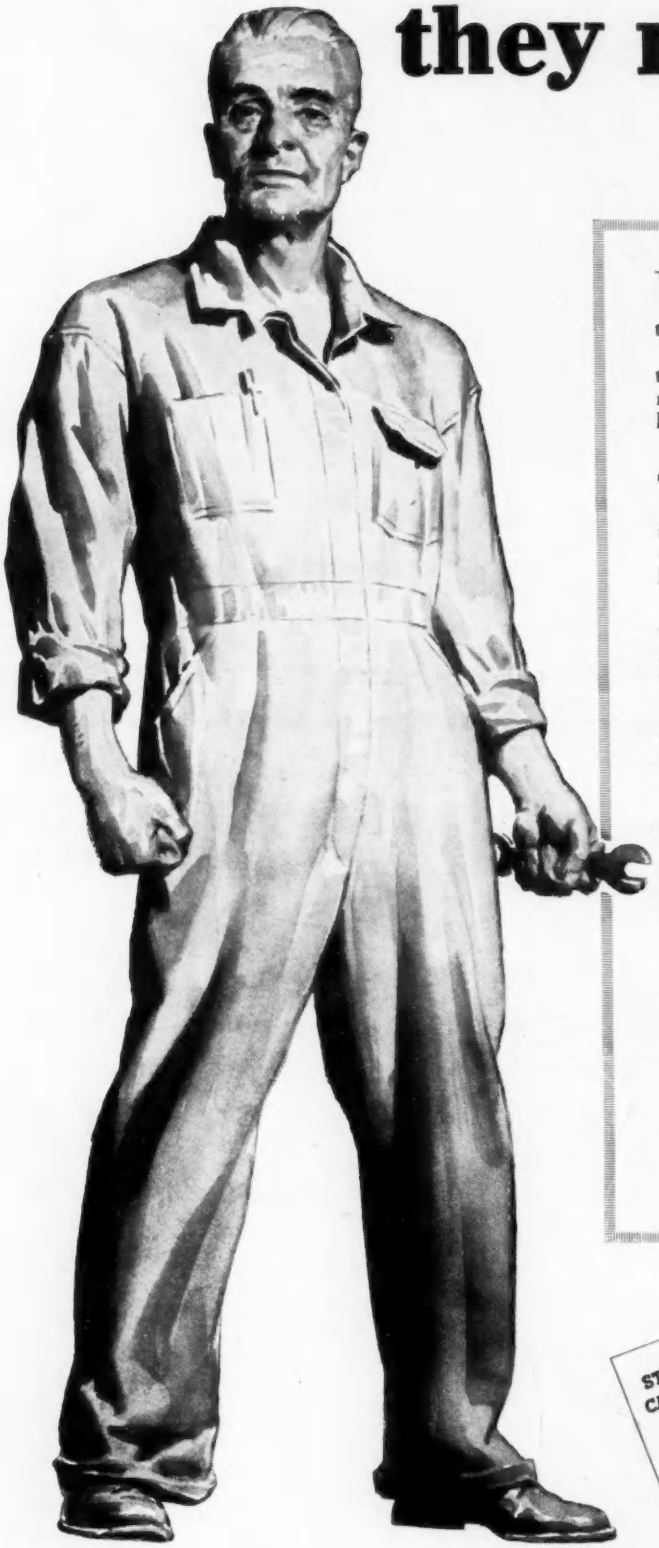
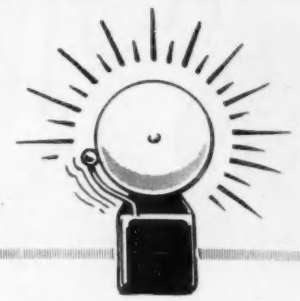
TRANSACTIONS SECTION

MEN, that was *our* bell they rang!





WITH a war to win, Uncle Sam has entrusted certain jobs to virtually every industry in America.

To the Automotive Service Industry has been assigned the duty of keeping the nation's vital motor vehicles rolling—to feed and clothe and guard the health of hard-working civilian America.

That's an honorable task—a mighty big one—an enormously important one—a very urgent one.

And ahead of that, of course—ahead of any civilian needs—comes the army's vehicle service requirements—parts and supplies for maintenance and repair of hundreds of thousands of fighting units.

Yes, they've rung the bell for the whole Service Industry, loud and long! And all of us are answering it with determination to do our job with all the ability and energy we possess, and with absolute fairness.

As a part of this industry, Bendix has, with our government's permission, produced and made available a store of precision-built service replacement and repair parts.

But we don't believe our part of the job ends there. These are times when all the "know-how" of all of us must be used for the good of our nation—for Victory. Through years of building carburetors, brakes, power braking and the like for the majority of the vehicles now in service, Bendix technicians have accumulated a vast store of useful servicing information.

We are putting much of this data into book form. Some of it is now available to fleet and shop service directors, schools or other organizations which have the task of training men. See the coupon below.

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Facts ABOUT OUR RUBBER SITUATION

What is the truth about the rubber situation?

What about Brazilian rubber . . . guayule? How about getting rubber from poinsettias, fig trees, desert shrubs, or various other previously unused sources?

Here Mr. Drew gives the answers – briefly, crisply.

"Every idea developed for the last 20 years in regard to rubber or rubber-like materials has been dusted off and brought out again," he reports, "but synthetic rubber from petroleum remains our only sound means for replacing the supply cut off by Japan."

In this article – as timely as the latest war bulletins and far more permanent in its impact on our economy – Mr. Drew tells how and why he reaches this conclusion.

■ ■ ■

by P. W. DREW

Chief Chemist, Development Department, Goodyear Tire and Rubber Co. of Calif.

THE rubber situation today is very serious as it affects us all.

In order to discuss my subject, "Facts About the Rubber Situation," this paper will be divided into four parts:

1. Normal Rubber Sources;
2. Present Rubber Needs;
3. Present Rubber Source Possibilities; and
4. Effect of Rubber Situation on You and Me

■ Normal Rubber Sources

From an historical standpoint, rubber was discovered by Columbus on his second trip to this continent when he found the Central American Indians playing with a ball that bounced unlike anything he had seen before. So rubber is distinctly an American product. After that time, it was not until 1830, when Goodyear, MacIntosh, and Hancock started to experiment with what they called india rubber, that any commercial use was made of this material.

The first source of rubber was wild rubber from the Amazon River Valley. This type of rubber was collected by the natives tapping isolated trees in the jungles or even cutting the trees completely down, bringing their day's collection of latex back to their huts and drying it on a stick over a smoking fire. One season's production per native might be one so-called rubber ham. built up on a stick in this manner, weigh-

ing approximately 75 lb. This rubber is then collected by merchants and sold in this form as the well known para rubber.

The Brazilian Government, in order to protect its monopoly on rubber, would not permit any seeds or plants to be taken from the country. However, in 1870, Sir Henry Wickham collected 70,000 seeds and under the guise of "rare botanical specimens" got them out of the country to England. About 2000 plants of the Hevea rubber tree were raised in Kew Gardens, London, and sent to British Malaya where the first rubber plantations were started.

From this small beginning, the rubber plantations grew to great size and spread into Ceylon, Sumatra, Java, and other East Indian Islands. Sumatra is now the largest producing area.

The Goodyear Tire & Rubber Co. has, *or had,* four plantations in the East Indies, three in Sumatra and one in the Philippines. U. S. Rubber Co. also has, or had, a number of plantations in Sumatra. This Goodyear Philippine plantation is interesting because, in 1937, the Dutch and British followed the previous practice of Brazil in not allowing any seeds or plants to be taken from their country. It was from this Philippine plantation that cuttings were available for plantings now being made in Costa Rica, Panama, and Brazil, as well as the Firestone plantation in Liberia, Africa.

The Central American plantations are quite small. The Firestone plantation consists of about one million acres and is producing considerable rubber. The Ford plantation in Brazil is about 2,500,000 acres, but is only in partial production as yet.

■ Production

Ninety-seven per cent of all natural rubber used today comes, *or came,* from British Malaya and the Dutch East Indies. Approximately one and a quarter million tons are produced per year. We use approximately 800,000 tons of rubber per year plus 150,000 tons of reclaimed rubber. We have a stockpile of approximately 650,000 tons, or less than one year's requirements.

■ Present Rubber Needs

Uses of rubber will be discussed in the order of their importance. The first group, of course, is military uses.

1. *Airplane Parts* – This group includes tires, bullet-sealing tanks, de-icers, life rafts, flotation tanks, motor parts, and so on.

2. *Tank Parts* – Rubber tracks, solid tires that the tracks run on – called bogie rollers, bullet-sealing tanks, sponge padding for the interior, motor parts, and so on.

3. *Military Trucks* require tires, bullet-sealing fuel tanks, and motor parts. In 1941, 11,750,000 tires were required for military vehicles. It was estimated that 18,000,000 will be required for 1942.

4. *Barrage Balloons* – Fabric for these balloons is coated with rubber and Neoprene. The English use balloons which operate at 5000 ft. We now have balloons for 10,000 and 15,000-ft use.

5. *Gas Masks* – These units are made of rubber-face pieces or rubber-covered fabrics.

6. *Fire Hose and Fire Fighting Equipment.*

7. *Heavy Trucks* used in wholesale goods transportation.

8. *General Factory Needs,* such as belts, hose, hydraulic press pads, countless washers and other items.

9. *Necessary Passenger Buses and Cars.*

10. *Normal Passenger-Car Needs.*

Notice that this last need, which is nearest home, is the last item on the list and therefore will be the slowest item to be handled.

A few figures on the per cent of rubber going into different items may be of interest. In 1941, 63% of all rubber used in the United States went into the making of 65,000,000 tires; 10% was used in tubes; 3% was used in repair materials; 9%, mechanical goods; 5%, drug and sport sundries; 7%, boots and shoes; and 3% in miscellaneous items.

■ Present Rubber Source Possibilities

Next we come to the most interesting phase of this question – present rubber source possibilities.

1. *Rubber Stock Pile* – This undoubtedly will be reserved for military use.

2. *Reclaimed Rubber* – 150,000 tons are used annually. In January, 1942, we used reclaim at the rate of 270,000 tons per yr. There are about 1,000,000 tons of tires available for reclaim, which will produce about 600,000 tons of reclaim. Our reclaiming capacity is 300,000 tons per yr, so reclaim available cannot be processed in less than 2 yr.

3. *Wild Rubber* – The method of gathering was discussed previously, and everyone agrees that this source will be difficult to develop in time to be of any great value. About 16,000 tons were produced in 1941, but Brazil consumed 12,000 tons. However, the Brazilian Foreign Minister declares that there is plenty of rubber in the Amazon Valley that can be gotten out if we are willing to pay enough for it. But they want guarantees of continued buying after the war is over. Such guarantees are difficult for our government to make.

4. *Guayule* – This is a desert shrub rubber produced in Mexico and California, so much in the news lately. To extract the rubber from this plant, the whole thing is ground up and the rubber water extracted. Last year, the production was 5000 tons and, as it takes at least four years to bring the plants to a productive stage, this cannot be a complete answer to the rubber problem.

The rubber contains approximately 20% resin; therefore it is only about 80% as useful as plantation rubber.

5. *Synthetic Rubber* is the most interesting and best possibility of meeting rubber needs. This type of rubber is now being used by Germany, produced from coal. It must be remembered, however, that as soon as war was declared Germany confiscated all non-military tires and had plants in operation to produce 50% of its rubber requirements.

There are numerous types of synthetic rubber, the total production of which was 17,000 tons in 1941, or approximately 2%. I will discuss the types in the order of their present production:

■ Neoprene

Neoprene is made by du Pont. This is not actually a synthetic rubber, but a rubber-like material, chemically

This paper was presented at a Southern California Section Meeting of the Society, Los Angeles, Calif., Feb. 27, 1942.

known as chloroprene. This was the first successful synthetic rubber either in the United States or in Europe. The first commercial production was made in 1931. From that time until 1941, when 6500 tons were produced, a great deal of improvement had been made in this product and the industry in general has learned how to use it.

Du Pont now has plants almost completed to produce an additional 13,000 tons annually. All automotive men are well acquainted with its use as oil-resistant rubber, as motor mounts, gaskets, and fuel hose lining. It is slightly stiffer and less resilient than natural rubber and has greater resistance to oils and heat. It swells about twenty per cent in gasoline while rubber swells several hundred per cent. Neoprene is being used extensively in barrage-balloon and gas-mask work because of its low gas-diffusion characteristic.

■ Thiokol

Thiokol is an organic polysulfide. This stiff but slightly rubber-like material was developed in 1932 and is now produced by the Dow Chemical Co. at the rate of 2000 tons in 1941; equipment is under construction to double this figure in 1942. It is very resistant to gasoline and benzols, swelling less than 5%, but it has too little elasticity and too much flow under pressure for many uses. Its largest use is hose lining.

■ Butadiene Rubber or Buna Rubber

This is the true synthetic rubber, the type being made from coal in Germany. In this country butadiene is produced from butane which comes from crude oil refining and cracking. About 4000 tons of this type of rubber were produced in 1941, by Goodrich, Goodyear, and Standard Oil.

In May, 1941, Jesse Jones, of the RFC, authorized Goodrich, Goodyear, Firestone and U. S. Rubber Companies to build one plant each with a capacity of 10,000 tons per year, or a total conditional capacity of 40,000 tons. On Jan. 12, 1942, Jesse Jones announced a program for expansion of synthetic rubber production calling for $400,000,000 which will provide for the manufacture of 400,000 tons per year in addition to the plants already in operation or under construction.

The American Chemical Society and a committee set up by the Fifth Division Oil Co-Ordinator, are trying to get some of these plants located in Southern California as butadiene is to be produced locally.

Rubber made from butadiene and styrene is very similar to plantation rubber and can be used in tires producing equal mileage. Another type is made from butadiene and acrylonitrile for use as gasoline and benzol-resistant rubber. This material has elasticity equal to natural rubber and yet swells less than 20% in these solvents. Butadiene, which represents approximately 80% of the raw material in this rubber, can be produced by the petroleum industry at a rate 50 times greater than necessary for the $400,000,000 program without interfering with the production of any of their other products.

This is obviously the way to solve the rubber shortage. It will take at least 18 months to handle our military needs and about that much longer to handle civilian needs if that is later considered essential.

It is interesting to follow the program in synthetic rubber development as it has been shuttled back and forth between the United States and Germany. During the first World War, Germany developed a very poor so-called sodium rubber with no real commercial value. Then du Pont developed Neoprene. Improving on this product, the Germans developed Buna rubber, and now we in this country are improving on the Buna rubber in our various synthetic types, namely Hy-Car, Chemigum, and Butyl rubber.

In addition to the three types of synthetic rubber described which are now actually in production, the papers have been full of various sound and "crackpot" suggestions. I will run over these quickly in order to answer any possible questions regarding them.

■ Rubber from Corn Sugar

This is a distinct possibility as butadiene can be made from corn sugar and subsequently made into synthetic rubber. This source of butadiene competes with raw material for sugar and alcohol so necessary for powder production; therefore, it is of questionable value.

■ Rubber from Various Common Plants

We have recently tested saps from poinsettias, fig trees, and desert shrubs of all kinds, and have found that they contain either too small an amount of rubber or that the rubber is, as in the case of poinsettias, over 50% resin.

A great deal of work has been done on *milkweed* as a source of rubber. Many of the steps in the process are undeveloped, but it may have some possibilities. However, as yet, it must be considered in a questionable column.

Every idea developed for the last 20 years in regard to rubber or rubber-like materials has been dusted off and brought out again, but synthetic rubber from petroleum remains our only sound means for replacing the rubber supply cut off by the Japanese.

To summarize, we need 800,000 tons of raw rubber per year and have a stockpile of 650,000 tons; 400,000 tons are needed for military purposes alone. We have plans to produce 500,000 tons of synthetic rubber per year within the next 18 months. Although it is unnecessary to discuss with SAE Journal readers ways and means of caring for tires, I would like to say that, by reducing car speeds from 55 mph to 35 mph, a tire which will give a normal mileage of 30,000 miles will increase to approximately 45,000 miles, or the equivalent of 2 years' normal driving mileage.

As to the effect of the rubber situation on you and me, we must face the fact that we have only enough rubber on hand to supply our military needs until synthetic rubber production can be developed. At the present time, no program is under way that will alleviate the rubber shortage now being felt in civilian usage.

Our government is gently but firmly guiding us to the realization that all unnecessary civilian rubber usage will cease as soon as the individual's supply on hand is used up.

We must realize that rubber is one of the two most essential items cut off by the Japanese invasion of the East Indies, and that civilian needs will have to be disregarded in favor of military needs if we are to win this war.

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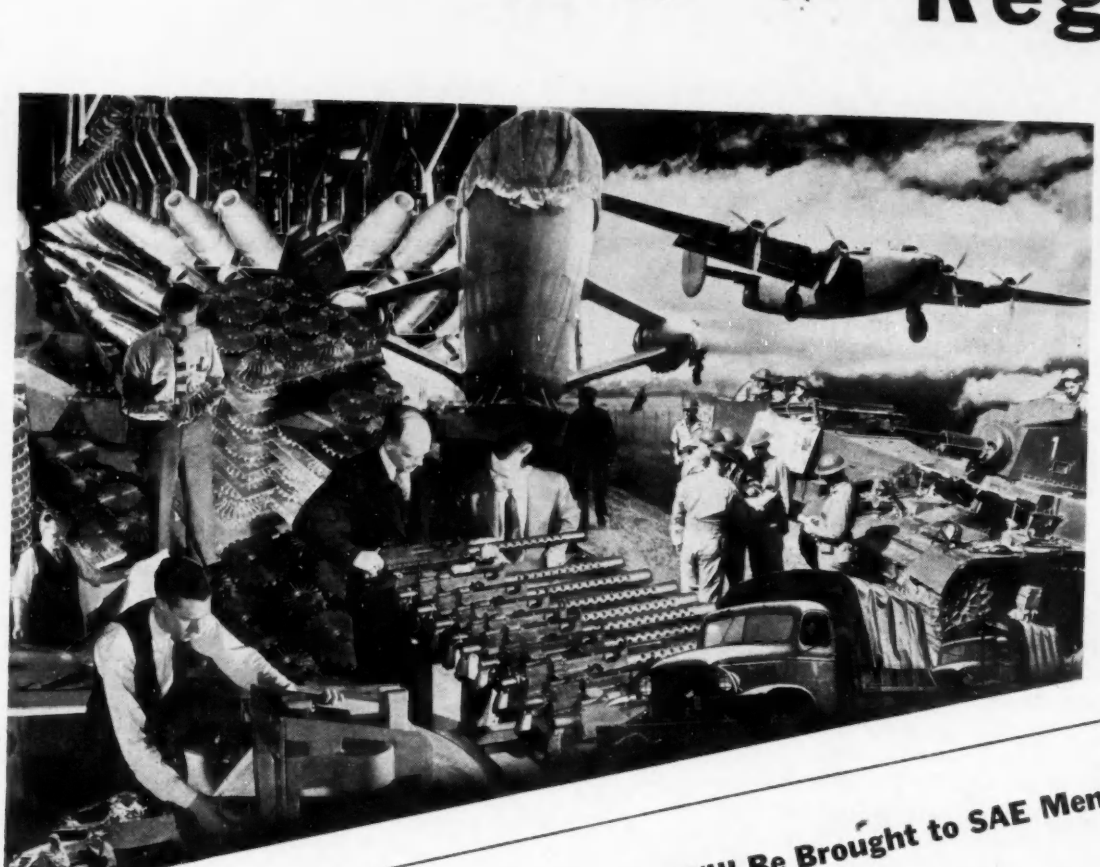

How the Summer Meeting Will Be Brought to SAE Members

Local Meetings

Special meetings will be arranged under the sponsorship of National Activity Committees in various cities where particular Activity interest centers.

National officers will offer cooperation to Sections in development of special programs where desired. This effort will continue vigorously throughout the summer and fall.

SAE Members will get their full quota of technical fare throughout the months which lie immediately ahead. From their Society will come the full volume of engineering information they have been expecting and needing in connection with the vital war projects on which they are engaged.

July SAE Journal

In every technical sense, the July Issue of the SAE Journal will be the greatest "Summer Meeting Issue" ever developed.

Digging deep into the well of vital, current war engineering data, ready at hand in papers prepared for the 1942 Summer Meeting, this July Issue will bring direct to each member's desk an imposing and interesting volume of information.

Included will be a report of the highlights of the data appearing in available papers already prepared for the Summer Meeting; an unusually large volume of printed-in-full papers drawn from those which were to have been presented; and many other special features designed to make this a really great issue.

Meetings Planned to Replace SUMMER MEETING

Transportation Priorities Rule Out Scheduled Meeting

CONTINUED presence of enemy diplomats at The Greenbrier, White Sulphur Springs, has made it impossible to hold the 1942 SAE Summer Meeting there as originally planned.

Emergency war conditions make it impossible for the railroads to guarantee sufficient special Pullman cars to carry SAE crowds to White Sulphur or any other suitable site.

THEREFORE

The SAE Council has decided *to take the meeting to the members – in two ways:*

1. ***SAE National Activity Committees will take special meetings to various Section cities throughout the summer and fall.***
2. ***The July Issue of the SAE Journal will bring to each member's desk a large volume of special engineering features drawn from the wealth of technical data developed in anticipation of the Summer Meeting.***

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SAE War Engineering Board Expands; Assumes Vital Military Assignments

CONSUMMATION of extensive assignments from the Ordnance Department and the Quartermaster Corps – in process of development for some weeks – and expansion of assistance to the War Production Board highlight SAE War Engineering Board activities of last month.

Appointment of six new members has equipped the Board to deal effectively with its expanded responsibilities and to encompass engineering work on all types of military equipment being built by the automotive and aircraft industries. New SAE-WEB members appointed by Chairman J. C. Zeder, are Don R. Berlin, aircraft consultant, General Motors Corp.; Arthur Nutt, vice president, Wright Aeronautical Corp.; L. R. Buckendale, chief engineer, The Timken-Detroit Axle Co.; C. G. A. Rosen, director of research, Caterpillar Tractor Co.; R. R. Teetor, vice president, Perfect Circle Co.; and E. H. Smith, executive engineer, Packard Motor Car Co.

As in the past, the Board is performing its technical work on each new assignment through fast-acting subcommittees, formed for the special job and under the direction of a WEB member as sponsor. Both the number of subcommittees and their personnel are multiplying steadily with each new call for service. As this issue goes to press, WEB subcommittees comprising a membership of more than 100 engineers are at work on projects assigned to the Board by the Ordnance Department, the Quartermaster Corps, the WPB, and the Automotive Council for War Production.

Ordnance Projects in Process

A meeting of WEB representatives with Gen. G. M. Barnes, Ordnance Department, and officers of Gen. Barnes' staff on March 30, laid the foundation for a broad program of cooperative work on ordnance engineering projects covering assistance in elimination of critical materials from ordnance equipment, in a consulting-engineering capacity on specific problems as assigned by Gen. Barnes and in such other technical matters as may be desired by this military agency.

As part of this broad program, the SAE-WEB already is making a check-up of electrical equipment on pilot models of the M-4 tank, has completed one phase of an emergency critical materials study in connection with that unit, and is engaged in a detailed study of possible eliminations or reduction in the use of aluminum, chromium, nickel, tin, copper, cork, vanadium, and zinc in scout cars and half-track vehicles.

Quartermaster Corps Projects Active

Meetings of WEB representatives with Col. E. S. Van Deusen, Motor Transport Division, Quartermaster Corps, in recent weeks has laid the foundation for broad technical working liaison with this branch of the military and resulted in immediate activity on several assignments. Important among these are an extensive development project having to do with cold-starting problems in connection with military motor vehicles; studies looking toward recommendations regarding reduction of critical materials in the steels now used in front and rear axles of transfer cases of QMC vehicles 2½ tons and larger; and exploration of the best alternate exhaust-valve-head materials with a view to minimizing the amounts of chromium, nickel, and tungsten in steels currently used for these units.

WPB Aid Expanded

In response to requests from the Automotive and other branches of the War Production Board, the SAE-WEB has been accelerating its assistance for these agencies in recommendations as to minimum critical material content of automotive parts. SAE-WEB members and representatives have been made available for technical consultation to WPB groups involved in writing materials orders and SAE-WEB has been preparing reports for these groups in increasing numbers since Pearl Harbor. New requests for data are coming from WPB sources weekly and are being expedited through SAE-WEB subcommittee channels as rapidly as possible. The Board is also working with WPB in an engineering advisory capacity.

Engineering Liaison with ACWP

At the request of the Automotive Council for War Production, the SAE-WEB has appointed one WEB member to each of four organized ACWP Product Divisions to act as engineering liaison between the SAE-WEB and these Product Divisions. The appointments are:

Artillery Division – H. M. Northrup.
Aircraft-Engine Division – Arthur Nutt
Airframe Division – Don Berlin
Tanks, Armored Cars, and Parts Division – L. R. Buckendale

The Military Motor Vehicle Committee of the ACWP also has asked that an SAE-WEB member be appointed as technical liaison with its activities (which are somewhat broader in scope than those of the ACWP product divisions) and a WEB member will be named to that assignment.

Although the work of the ACWP Product Divisions is expected to be concerned mainly with production matters, allied engineering problems arise from time to time. The function of the SAE-WEB liaison appointees is to participate in ACWP Product Division meetings at which such engineering problems may arise and make available the facilities of the SAE-WEB for handling such problems.

The full membership of the SAE War Engineering Board in its augmented form is: J. C. Zeder, Chairman, chief engineer, Chrysler Corp.; B. B. Bachman, vice president, and chief engineer, Autocar Co.; Don R. Berlin, aircraft consultant, General Motors Corp.; L. R. Buckendale, chief engineer, The Timken-Detroit Axle Co.; J. M. Crawford, chief engineer, Chevrolet Motor Division, General Motors Corp.; R. E. Cole, vice president, engineering, Studebaker Corp.; F. F. Kishline, chief engineer, Nash-Kelvinator Corp.; R. H. McCarroll, The Ford Motor Co.; H. M. Northrup, vice president, engineering, Hudson Motor Car Co.; Arthur Nutt, vice president, engineering, Wright Aeronautical Corp.; D. G. Roos, vice president and chief engineer, Willys-Overland Motors, Inc.; C. G. A. Rosen, director of research, Caterpillar Tractor Co.; E. H. Smith, executive engineer, Packard Motor Car Co.; and Ralph R. Teetor, vice president, Perfect Circle Co.

Colwell and Wolf Named To SAE War Activity Council

PAST President A. T. Colwell and Austin M. Wolf have been named members of the SAE War Activity Council, governing body of all SAE war effort, WAC Chairman B. B. Bachman announced following a meeting of that group in Detroit on April 8.

Mr. Colwell represents the SAE as a member of the Board of the Automotive Council for War Production, and Mr. Wolf represents the Society on the War Department Motor-Vehicle Standardization Committee formed by the Under Secretary of War and chairmanned by Col. E. S. Van Deusen of the Quartermaster Corps.

Progress in every phase of SAE war work was reviewed at this meeting and new projects were assigned to SAE committees best fitted to assume them. (The full report of SAE war activities printed on pp. 21-24 of this issue includes the data brought out in the various reports to the WAC.)

Special SAE Committee Tackles Ordnance Standardization

THIRTY-SEVEN electrical and automotive engineers met in Detroit on March 16 to set up an "SAE Advisory Committee on Standardization of Tank and Combat Car Electrical Equipment," designed to implement the request of Col. J. K. Christmas, Ordnance Department, for action on standardization of electrical equipment in tanks and combat cars. John H. Hunt, chairman, SAE General Standards Committee, was made chairman of the new committee. It was indicated by L. S. Gerber, Office of Chief of Ordnance, who represented Col. Christmas at the meeting, that standardization of electrical equipment should proceed along two lines:

1. Standardization of mountings and attachments and of maximum overall dimensions of unit assemblies with no attempt to standardize the internal design of these assemblies except where it might be practical for manufacturers to use common parts at some points in the assembly. However, the basic objective here would be to provide interchangeability of unit assemblies.

2. Standardization of the design of the unit or part.

It was decided further that the standardization work would be handled by five groups concentrating on each of the following types of electrical equipment: (a) generators, starters, ignition, and regulators, W. P. Loudon, chairman; (b) instruments, A. W. LeFevre, chairman; (c) controls, E. F. Webb, chairman; (d) lights, H. C. Mead, chairman; and (e) cable and connections, Shelton Wright, chairman. Personnel of the committee, the function of which is to insure proper coordination of group activities, consists of these group chairmen and the committee chairman, Mr. Hunt. The Ordnance Department agreed to send representatives to committee and subcommittee meetings.

Through frequent meetings and intensive activity, substantial progress has been made toward successful completion of the project.

The SAE Is At WAR

Bulletin

SAE war activities today penetrate every military and governmental agency concerned with automotive and aeronautic products or problems.

Twenty months of intense effort on World War II have recorded technical accomplishment by working SAE committees on cooperative projects involving the Ordnance Department, the Quartermaster Corps, the Army and Navy air arms, the Aeronautical Branch and the Automotive Branch of the War Production Board, the Office of Defense Transportation, a variety of materials branches of WPB, advisory contacts with the technical division of the Bureau of Economic Warfare and the Office of the Petroleum Coordinator, and continuous contacts with ranking officials of the War and Navy Departments.

In addition, engineering advisory service is being provided to product divisions of the Automotive Council for War Production – the organization through which automotive manufacturers are coordinating their war production efforts – and experienced SAE staff personnel has been made available to ACWP to assist in the development of its all-important program.

Nearly half-a-hundred specialized, streamlined committees and subcommittees of the Society – their efforts coordinated through the SAE War Activity Council, supervising agency of all SAE War work – are implementing the Society's all-out attack of war engineering problems. Literally hundreds of members are involved in carrying out scores of government-assigned projects, getting war-needed results possible only through experienced group action. Tanks, guns, planes, ammunition – every type of mobile (and some immobile) equipment with which World War II is being fought already is benefiting from the technical drive of result-producing SAE committees.

. . . And the work has only begun. Within the last few weeks demands for increased SAE service have been jumping in almost geometrical progression. Engineering branches of the Army concerned with automotive equipment particularly have sought – and are receiving – fast, practical action on a growing number of special problems.

So rapidly is SAE war work expanding, so promptly are jobs being completed and working groups disbanded when specialized missions have been completed, and so changing are the war-service demands facing the Society that a complete and accurate picture of the entire activity cannot be reduced to type and printed in time to reach all members before some element becomes out of date. But even an outline of the broad channels through which measurable quantities of SAE war work are flowing consistently dramatizes vividly the growing power and strength of the Society's technical offensive against the forces of evil which oppose our country and its ideals.

turn to next page

SAE War Activity Council

All requests from the **Army, Navy** and other **Government agencies** are correlated by the **SAE War Activity Council,** which makes assignments of specific tasks to those committees best qualified by personnel and experience to handle the work. This Council was organizd in June, 1940, SAE defense activities having been under way since late in 1939.

Chairman of the **SAE WAC** is **B. B. Bachman,** a past president of the Society and who, for most of the 32 years he has been a member, has been in the forefront of administrative and technical committee work of the SAE. He and his eleven associates on the War Activity Council have, in the aggregate, a total of 284 years of SAE membership, an average of about 24 years each. They are:

Col. Herbert W. Alden is chairman of the **SAE Ordnance Advisory Committee,** as mentioned above. A "founder member" of the Society (1905), Col. Alden is the only SAE two-term president.

A. T. Colwell, past president, as representative of the Society on the **Automotive Council for War Production,** is a member of SAE-WAC.

A. G. Herreshoff, chairman of the **SAE Engineering Relations Committee,** has general supervision of the Society's engineering relationships with outside civilian agencies. He has served on a number of standards and technical committees during his 27 years of SAE membership.

L. Clayton Hill, chairman, **SAE Quartermaster Corps Advisory Committee on Standardization,** has had long experience in every phase of SAE work. He is a past councilor, a past chairman of the Detroit Section, and has served on a number of administrative and technical committees of SAE.

John H. Hunt is chairman of the **SAE Standards Committee,** which has general supervision of the 17 divisions, four subdivisions, and five committees – which serve as "steering committees" for scores of working subcommittees with a total membership of **310** engineers and technologists on permanent groups and scores of others on special committees. Mr. Hunt is a past president of SAE.

Dr. George W. Lewis is chairman of the **SAE Research Committee.** This has general supervision of fifteen research committees and divisions working on specific research projects. A past vice president of the Society, he is director of aeronautical research, National Advisory Committee for Aeronautics.

J. B. Macauley, Jr., chairman of the **SAE Lubricants Advisory Committee,** also is a past vice president of the SAE, and brings to his work a rich background of the work of the Cooperative Fuels Research Committee and SAE lubricants research.

Arthur Nutt is chairman of the **Aeronautics Division,** SAE Standards Committee, which is responsible for the widespread standardization work undertaken at the request of the War Production Board, with the cooperation of the Army, Navy, interested government agencies, and other technical groups interested in aeronautical standards. He is a past president of the Society.

T. L. Preble, chairman of the **SAE Transportation & Maintenance Advisory Committee,** has been spending most of his time for the past year in Washington. A past vice president of the Society, he has directed a major part of the T&M Activity program in relation to war emergency work.

Austin M. Wolf, a two-term Councilor and former Metropolitan Section chairman, represents the Society on the **War Department Motor-Vehicle Standardization Committee** established by the Under Secretary of War.

James C. Zeder, chairman of the **SAE War Engineering Board,** composed of top-ranking engineers of the industry, has been in close touch with the whole Army mechanization program. He is a past vice president of the Society.

1. SAE WAR ENGINEERING BOARD

This Board moved swiftly from the civilian problems which concerned its early meetings last year to specific war work.

Currently (through specialized subcommittees) it is engaged on an extensive program of materials conservation for the Ordnance Department; is working on similar problems under a new assignment from the Motor Transport Division of the Quartermaster Corps; is cooperating with the several branches of the War Production Board; is providing engineering advisory representatives for product divisions of the Automotive Council for War Production; is reviewing electrical layout of pilot models of the M4 tank at Ordnance Department request. The Board is laying the groundwork for other consulting engineering projects in the service of the Quartermaster Corps and Ordnance Department.

Chairman of the War Engineering Board is J. C. Zeder, chief engineer, Chrysler Corp.

2. SAE AERONAUTICS DIVISION

Stimulated by War Production Board assignments, coordinated with the Army and Navy, and paced by ever-growing war needs, aeronautical standards have moved

forward with increasing speed since this program was initiated a little more than a year ago. Our government gave the SAE the heavy responsibility for accelerating aeronautical standardization of engines, propellers, accessories and equipment, and materials and processes for aircraft engines, airframes, and accessories, on Feb. 28, 1941.

By the time the Japs struck at Pearl Harbor, the SAE had mobilized 160 aeronautical engineers and specialists into 43 practical working groups, had held 135 committee meetings, and had completed 42 important new and revised Aeronautical Standards (AS) and had actually issued 177 Aeronautical Materials Specifications (AMS) to more than a thousand aircraft, engine, accessory and parts manufacturers from coast to coast. One outstanding achievement was the basic SAE Aircraft-Engine Drafting Room Manual, of which more than 1000 have been issued at the cost of printing, to date.

Since Pearl Harbor, this huge project has advanced at an increased speed, with scores of other AS and AMS standards and specifications approved and issued, with others in process of approval.

Never in the history of industrial standardization has there been an achievement surpassing this record of so much accomplished in so short a time. At each step, this work, with its many ramifications, has been carefully correlated with the Army and Navy – and with industry. Furthermore, constant cooperation with standards work of the National Aeronautical Standards Committee, specializing on airframe standards, has been maintained in certain intermediate areas.

Thus the long experience in cooperative committee work of the Society played a major role in guiding this pioneering effort in solving vital problems of producing aircraft to meet the President's quotas. Arthur Nutt is chairman of this Aeronautics Division.

3. SAE ORDNANCE ADVISORY COMMITTEE

Under the chairmanship of Col. H. W. Alden, projects, largely confidential, are being carried on with the Ordnance Department of the U. S. Army. They apply to tanks and other mechanized equipment of the Ordnance Department. This committee has subcommittees on rubber including tire and wheel standardization, suspensions, and transmissions. This group has recommended fundamental engineering on ordnance items. Total membership comprises 22 men.

4. SAE QUARTERMASTER CORPS ADVISORY COMMITTEE

Under the chairmanship of L. C. Hill, this committee was formed at the specific request of Quartermaster-General E. B. Gregory. It quickly completed and submitted to the Quartermaster General recommendations of the standardization of more than 100 items on Army trucks.

Its work in this field is continuing on a number of items which have been referred to the committee by Camp Holabird, QMC, and accelerated work is in the offing through SAE cooperation with an Engineering Committee of the ACWP truck division which is planning to work with the Quartermaster Corps on standards problems, as well as other problems of mutual interest.

5. SAE TRANSPORTATION AND MAINTENANCE ADVISORY COMMITTEE

At the request of John L. Rogers, director, Motor Transport Division of the Office of Defense Transportation, this group has undertaken an extensive program in connection with the ODT concerned with training drivers, training mechanics, salvaging materials, enhancing the intensity of usage of trucks, and a number of other allied subjects. T. L. Preble is chairman.

This group also is awaiting a directive expected to follow a letter already received from Quartermaster-General E. B. Gregory, asking the SAE to cooperate with the Quartermaster Corps on technical problems involved in the Army's utilization of trucks and passenger cars.

6. SAE LUBRICANTS ADVISORY COMMITTEE

Chairmanned by J. B. Macauley, Jr., and including a membership of seven, the SAE Lubricants Advisory Committee cooperates with such government agencies as may request its advisory services. To date, the committee has worked primarily with the National Bureau of Standards, the Quartermaster Corps, and the Ordnance Department on problems of lubrication. The committee was organized a year ago by merging parts of the membership of the Cooperative Fuels Research Committee and the SAE research groups on lubricants at the request of the National Bureau of Standards.

Brig.-Gen. J. L. Frink, head of QMC Motor Transport Corps, on March 11 informed this committee that he would look to it as the source of information and advice emanating from the SAE on lubricant problems.

Typical of the projects carried out at the request of various divisions of the Quartermaster Corps are reports on steam cooling for automotive engines; crankcase oils and their reclamation. Work for the Ordnance Department includes development of a test procedure for evaluating crankcase oils and determining the effectiveness of a proposed additive for reducing the octane requirement of automotive engines. Methods to be followed in used-engine-oil analysis, stability test for greases, air cleaners, engine lubricating oils, transmission lubricants, and air-cooled tank-engine lubricants are other subjects on which the Committee has been active, and given advice to the Ordnance Department. (This committee will function as an activity of the newly formed Cooperative Research Council as soon as this group – which is sponsored jointly by the SAE and the American Petroleum Institute – formally begins operations.)

7. COOPERATION WITH ACWP

In addition to naming engineering advisers to the Automotive Council for War Production product divisions, as already mentioned, the Society has put at the disposal of the ACWP important staff personnel assistance. A. T. Colwell, SAE past president, is a member of ACWP.

8. ORDNANCE STANDARDS PROJECT

The Society has been asked by the Ordnance Department to undertake a standards project in connection with

electrical equipment on tanks. The first meeting to consider this project was held March 9, and the extensive committee and subcommittee set-up necessary to quick completion of the project has been organized and is now functioning. J. H. Hunt is chairman.

9. CONTACTS WITH GOVERNMENT AGENCIES

SAE staff men of executive caliber are continuing to maintain normal and necessary engineering relations and contacts with a variety of government agencies including the American Association of Motor Vehicle Administrators, the Interstate Commerce Commission, the various branches of the War Production Board concerned with automotive military or civilian matters, the Office of Defense Transportation, and a variety of state and municipal agencies having to do with automotive engineering matters.

10. WPB – SAE – ASTM – AISI NATIONAL EMERGENCY STEEL SIMPLIFICATION

Organized by the WPB and under the co-sponsorship of SAE, American Society for Testing Materials and American Iron and Steel Institute, the National Emergency Steel Simplification project has been aimed at increasing production and conservation of alloying materials by reducing the number and variety of steel specifications. SAE representation is headed by F. P. Gilligan, chairman, SAE Iron and Steel Division, with J. B. Johnson serving as alternate. Active, direct and *early* participation of the SAE in this project has resulted in its constructive development.

11. SAE – ASTM RUBBER PROJECT

Under the co-sponsorship of the SAE and the ASTM, this project included the development of a minimum number of standard mechanical rubber compounds as a conservation measure during the emergency. This project was handled by Subcommittee IV of the SAE-ASTM Technical Committee A on Automotive Rubber. Included also in the work of Subcommittee IV is the development of a standard for hose for cooling systems for use with substitute antifreezes; another subcommittee is working on a classification for synthetics, and development of test methods and testing equipment. This committee is under the chairmanship of W. J. McCortney. It includes 26 members.

12. SAE – OCD COOPERATION

The staff is maintaining contact with the Office of Civilian Defense, particularly in connection with regulations covering motor-vehicle lighting under blackout conditions.

13. SAE ADVISORY COMMITTEE ON BLACKOUT LIGHTING EQUIPMENT FOR MOTOR VEHICLES

At the request of Capt. Everett of the Engineers Board, a small SAE committee recently completed its work in an advisory capacity on specifications for blackout lighting equipment to be issued by the War Department. This work included development of a standard design of blackout headlight.

14. RESEARCH COOPERATION

Contacts and cooperation with military and government agencies are taking place on such research items as: aircraft-engine lubricants; aircraft rust preventives; extreme-pressure lubricants; ignition research; and riding comfort. This work is under the general supervision of Dr. George W. Lewis.

This broad cooperative research program includes investigation of the characteristics of aircraft-engine lubricants required to meet combat conditions; developing methods of test for rust preventives for aircraft engines and parts; setting up test methods for the evaluation of extreme-pressure lubricants in Army procurement; and investigations of riding comfort for the Armored Forces.

15. RADIO INTERFERENCE

Since last September, the SAE Committee on Radio Interference has been cooperating with the U. S. Army Signal Corps, the Ordnance Department and the Quartermaster Corps on an intensive project on test procedure projects.

With a background of several years of study of the phenomena of automobile ignition interference, the Reference Screen Room for the inspection and testing of radio noise suppression was quickly developed (p. 722, 1942 SAE Handbook). Each manufacturer of Army tactical vehicles will be required to provide a screen room, as described in the new standard, for testing completed vehicles. P. J. Kent is chairman of this committee which has been coordinating its work with that of air services of the Canadian Department of Transport.

16. ENGINEERS' DEFENSE BOARD

The Engineers' Defense Board is an organization of engineers and technologists representing the several national engineering societies, constituted for the purpose of dealing with technical problems on shortages, substitutions, conservation, raw materials, production and reclamation in the nation-wide adjustment under the impact of the defense effort. SAE representatives on this Board are C. L. McCuen, Frank Caldwell, C. E. Frudden, Arthur Nutt, and J. C. Zeder. Chairman of the Board is Robert E. McConnell. Other organizations represented are: American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers, American Institute of Chemical Engineers.

All Durable Industries Enlisted In Gigantic Swing to Armament

WITHIN two months no consumer durable goods industry will be working for civilians. "The face of American industry will be completely changed" Donald M. Nelson said, in discussing the impact of war on metal working industries in particular.

Two major orders, one a "stop construction" ukase and a sweeping steel conservation order (to be known as M-126), will complete the metatasis. Alloy steels, already amply covered by use restrictions, leave only carbon types to be covered. Mr. Nelson warns that the steel order will prohibit the use of carbon steels in hundreds of products – and double-checks for war needs by also prohibiting the use of a wide range of substitute materials for these products.

"These orders will culminate the policy initiated by closing the gigantic automobile industry" Mr. Nelson told the SAE Journal. "Even a number of morticians' goods can't be manufactured by the metal working industries," he said.

Comparing this war with the last, Mr. Nelson pointed out to a press conference that not a single limitation order was issued which completely prohibited the output of a single civilian product.

In August, 1918, he recalled, the automobile industry and the War Industries Board worked out an agreement to limit automobile production to a quarter of its normal output. The war then had been going on for 16 months.

"You can tell your members that this transition will be a most difficult period of transition. But it is the price we must pay to win. This is a part of total war, a technique in which our enemies excel.

"Rationing is not the way of American life, but it is the way to secure early victory," he said.

Including automobiles and trucks, manufacture of 79 categories of consumer durable goods have been prohibited.

WPB spokesmen expect that there will be no loopholes in this much-rewritten steel order.

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More "E" Flags Fly Over Plants

ADDITIONAL companies employing SAE members which have been awarded the Navy's "E" burgee in recognition of outstanding performance in fulfilling Navy contracts include:

Harnischfeger Corp., Milwaukee, Wis.
Packard Motor Car Co., Detroit, Mich.
Babcock & Wilcox, Barberton, Ohio.
Grumman Aircraft Engineering Corp., Bethpage, N. Y.
King-Seeley Corp., Ann Arbor, Mich.

No More Trucks

RUBBER shortage gave the count to *all* civilian truck manufacture April 11, and beginning in May none but Army and other government vehicles will be permitted to be built by the industry.

Thus, 60 days after passenger and light truck manufacture was stopped (Feb. 1) the industry is on a full war production basis. The order (L-1-f April 11) freezes currently-produced vehicles under General Conservation Order M-100, by which truck rationing for essential civilian needs was put under the joint direction of WPB and the Office of Defense Transportation.

Even trucks that have been built for the past several weeks have not been equipped by tires and tubes. Unless a potential customer has such tires and tubes in his stockroom, he can't get his trucks even if he obtains a certificate on a dealership.

However, off-the-highway vehicles weighing 24,000 lb or more, produced under March quotas, may be equipped with tires if they are to be used to transport materials on mining, construction, logging, or petroleum development projects.

Since the first of this year, about 90,070 medium and heavy trucks had been built, as compared with 88,085 during the first three months of 1941.

Types of vehicles *not* affected:

- Truck trailers,
- Bodies, and
- Certain types of buses.

In the meantime, Joseph B. Eastman, director, Office of Defense Transportation, established a special Appeal Board in Washington to consider appeals from decisions of ODT's local Allocation Offices. Appeals will come through local Appeal Boards – yet to be set up.

Members:

M. V. Fredehagen, liaison officer, Office of Civilian Defense.

W. Foster Banks, president, Motor Haulage Co., Brooklyn, an SAE member.

J. B. Pymer, secretary-treasurer, City Baking Co., Baltimore.

The joint WPB-ODT rationing program has been in effect since March 9.

Four days before the May 1 deadline was set on truck output, an extension of Limited Preference Rating Order P-45 was ordered, giving the truck manufacturers hope that they would be able to produce medium and heavy trucks for civilian use (by an A-3 priority rating) until May 31. This, of course, was canceled by WPB's sweeping order L-1-f.

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Army Expands Officer Schools

HUGE expansions are under way in the Army Officer School program and the SAE Journal has been asked to let its members know that the Army is seeking experienced automotive engineers as candidates.

Basic Requirement:

Three months' service as enlisted man in the Army.

The expanded program of the arms and services officer schools, to be operating at full capacity by the end of June, looks like this:

ARM OR SERVICE	INCREASE
Ordnance Department	20 times
Engineers Corps	16 times
Field Artillery	12 times
Signal Corps	12 times
Quartermaster Corps	12 times
Infantry	11 times
Coast Artillery	8 times
Armored Force	8 times
Chemical Warfare	5 times

Entrance: Determined largely by the grade secured as a soldier in the Army Classification Test, which is designed to test the candidate's ability to think and react speedily and accurately.

Prospective officers must be able to demonstrate outstanding qualities of leadership.

A man of reasonably broad civilian ex-

perience need not have an advanced academic education. However, special education and civilian engineering experience offers the candidate marked advantages in the following:

Signal Corps: Electrical engineering or electronics; particularly men who have had training in the communications field.

Armored Force: Automotive engineering and maintenance experience.

Corps of Engineers and Ordnance Dept.: Mechanical or civil engineering, or practical experience in highway or other types of construction.

Field Artillery: Automotive engineering, mathematics. Much of the new equipment is motorized.

Quartermasters Corps: Motor transport engineering and maintenance.

Chemical Warfare: Chemical engineering, laboratory work.

Army's Recommendation: Any SAE member eligible for draft should seek early induction to take advantage of the expanded officer training program after three months' service as a soldier, provided his present work is not important enough to permit deferment.

When Materials Are Bottlenecks

WHEN, within a few short months, SAE Member William L. Batt becomes war production's No. 1 whipping boy at the hands of Congressmen and colleagues in the War Production Board, the reason will be because rates of production will have caught up with materials output and stockpiles.

Also remember, when that time comes, that the Director of the Materials Division, WPB, *saw* the handwriting on the wall long months ago, but was unable to increase stockpiles because of:

- Lack of sufficient authority to commandeer materials, even to the extent of putting many consumer goods businesses out of business. In retrospect, none of the limitation and stop orders on manufacturing consumer goods were issued *early enough* to prevent the imminent shortages.
- Materials have been a political football, in which many old-timers in pre-defense Government agencies have been playing on the teams of Congressmen in these sand-lot encounters. Now that low grade ores are becoming big noise on front pages of newspapers, buckpassing is going to become rife.
- Inability of anyone to see that even the fantastic estimates of 6 and 12 months ago would be dwarfed when matched with actual needs of an all-out mechanized war. Estimates offered by Mr. Batt were so astronomical to the nation's thinking that they were not taken seriously.

WPB Joins In Contract Audits

WPB, Army, Navy, Treasury, Maritime Commission, and the Reconstruction Finance Corp., have been designated by the President to inspect plants and audit books of war contractors.

More Materials Added to "Scarce" List

MORE materials have been put in Group I in the listing of critical metals during the past 30 days by Harvey A. Anderson, chief, Conservation and Substitution Branch, WPB's Bureau of Industrial Conservation. Among the important changes, *i.e.*, shifts from lower to upper groups, were the inclusion of nickel scrap in Group I, shifting rhodium, mica splittings, and high-grade zinc from Group II up to Group I; upping common asbestos, and adding a number of automotive materials to Group III.

A number of building materials were also added in a special list which is available from the Bureau in Washington, or from local WPB offices.

Group I – Materials *critically essential* for war products. Many materials listed in this group are not available in sufficient quantities for direct military requirements. Military authorities have been asked to specify less of some of these in alloy compositions than has been customary in peacetime.

Group II – Also necessary for arms production, and only limited supplies are available for *necessary* civilian products.

Group III – Although supplies are *limited*, materials in this list are available for substitutions.

For economy of space, medicinal chemicals, fibers, edible oils, and other non-automotive materials have been eliminated from the list shown below. As changes are made they will be printed in the SAE Journal.

This is the second official listing by WPB. The first one appeared on p. 25, SAE Journal, April.

GROUP I

Materials Most Vitally Needed for War Purposes; Not Generally Available for Civilian Needs.

METALS

Alloy Steel
Aluminum
Aluminum Scrap
Cadmium
Calcium-Silicon
Chromium
Cobalt
Copper
Copper Scrap
Iridium
Iron Alloys
Magnesium
Nickel
Nickel Scrap
Rhodium
Tin
Tinplate and Terneplate
Tungsten & Tungsten Carbides
Vanadium
Wrought Iron
Zinc (high grade)

CHEMICALS

Acetone
Alcohol (Methyl)
Chlorinated Hydrocarbon Solvents
Chlorine
Formaldehyde
Halogenated Hydrocarbon Refrigerants
Methyl Methacrylate sheets
Phenol Formaldehyde Resins & Plastics
Phenol
Phosphates: Tricresyl; Triphenyl
Phthalic Anhydride and Phthlates
Polystyrene
Polyvinyl Chloride
Sodium Nitrate (pure)
Toluol
Urea Formaldehyde Plastic

MISCELLANEOUS PRODUCTS

Asbestos (long fiber)
Corundum
Graphite (Madagascar)
Mica Splittings
Rubber: Crude, Latex, Chlorinated, Synthetic
Shellacs
Tung Oil

GROUP II

Basic Materials that are Essential to the War Industries but Whose Supply is not as Critically Limited as Materials of Group I.

Alcohol, Ethyl
Antimony
Benzine
Beryllium-Copper
Butanol
Carbon Tetrachloride
Cryolite
Diamonds: Industrial, Dies
Ferrosilicon
Glycerine
Glycols
Hides
*Lead
Leather
Manganese
Mercury
Methyl Methacrylate Powder
Molybdenum
Natural Resins, except Rosin
Phosphorus
Pig Iron and Scrap
Platinum
Potassium Perchlorate Permanganate
Rubber (Reclaimed)
Ruthenium
Silicon and Alloys
Steel, Scrap
Tetraethyl Lead
Titanium Pigments
Vulcanized Fiber
Zinc (low grades)

*Lead was put in Group I in first issue by mistake.

COMPLETE scarce material lists (including other than automotive) are available from the Bureau of Industrial Conservation, War Production Board, Washington, D. C. Ask for WPB-921.

GROUP III

Materials available in significant quantities for other than strictly war purposes. However, the use may be restricted by accompanying manufacturing limitations. Restrictions are commonly imposed but supplies are not critically short, except in the case of iron and steel.

Preferred Substitute Materials:

Ammonia (Aqueous)
Asbestos (common)
Asphalt
Brick and Tile
Cellophane
Ceramics
Charcoal
Clay
Coal and Coke
Coal Tar Pitch
Concrete
Cotton (raw)
Emery
Feldspar
Fluorspar
Gilsonite (uintaite)
Glass
Gold
Gypsum and products
Indium
Iron, Gray, Cast
Iron, Malleable
Lignin plastics
Lime
Mica (common)
Osmium
Palladium
Paper (except Kraft and Parchments)
Petroleum Products
Crude Oil
Gasoline
Lubricating Oil
Paraffin
Plastics (cellulose acetate, butyrate)
Plywood (Unrestricted Binder)
Rosin and Derivatives
Silica Sand
Silver
Sodium Metasilicate
Soy Beans and Products, Protein, Oil
Steel, Bessemer
Steel, Low Carbon, Open Hearth
Sulfur
Turpentine
Uranium
Wood and Products, Sawdust, Wood Fibers, Wood Flour

Group Storage Plan Speeds Arms Handling

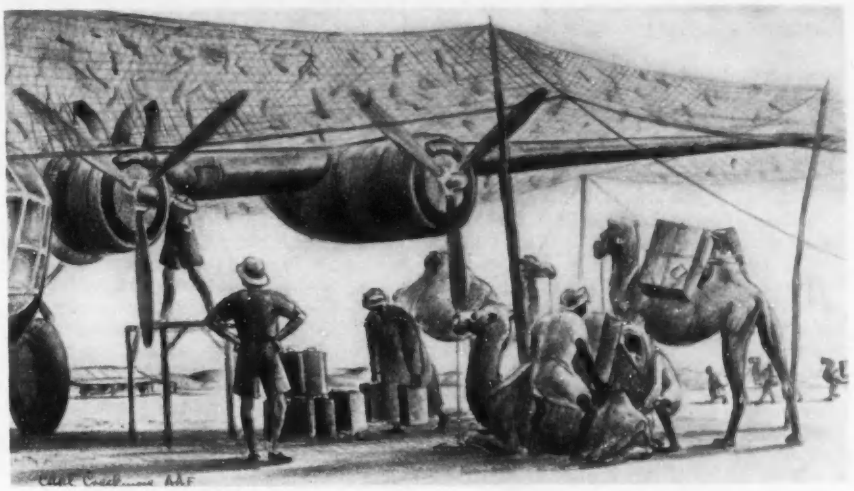
GROUP warehousing of materials, parts, and in some cases of machinery for defense manufacture has been developed by the Office of Defense Transportation. Groups of warehouses, usually members of a local association, are incorporated, and a procurement agency of the government signs a single contract instead of negotiating with a large number of warehouse concerns. Detroit space already has become acute.

It was recalled that warehousing of materials and storing finished arms prior to shipment abroad, constituted a serious bottleneck during the peak production months of World War I.

Today the 110 million sq ft of public merchandise warehouse space is about 80% occupied, ODT estimates. About 10 million sq ft is expected to be made immediately available for the war effort through the plan, which has the approval of the Department of Justice's Anti-Trust division.

A great deal of red tape is thus cut, and considerable paper work is eliminated by the plan, worked out by Col. Leo M. Nicholson, director of ODT's Division of Storage.

Safari on Wings



Thousands of camels, one of mankind's first domesticated animals, augment fleets of desert trucks in supplying fuel and oil to the U. S. Army Air Forces Ferry Command bases in Africa, Major Geoffrey Bonnell writes in the March-April Army Air Forces "News Letter." Payload is 35 gal. per camel; loading and unloading loss is 25%. "But the camels kept the ships flying on." Note overhead camouflage netting protecting the bomber.

Tin Specs Written To Save Its Use

PATTERNED by the National Emergency Steel Specifications (SAE Journal, April, 1942, p. 20) WPB's Bureau of Industrial Conservation has been concentrating its attention on tin.

A vast quantity of research data, much of it going back to World War I days, has been dusted off to save this precious metal in solder and castings.

Silver is the metallurgical hero of the day. From 1 to 5% of silver, alloyed with lead, is the highlight of the new solder series. Generally speaking, it is harder to work, has a critical utechtic (solidifying) point, and needs more heat than the common high-tin solders of yesterday.

In a sweeping recommendation, issued by the Federal Specifications Board, government procurement agencies are urged to use the bronze castings specifications, printed herewith, wherever possible.

Use of bronze is advised against wherever possible. When bronze must be used, the emergency alternates are recommended.

"Forgotten" Tools Sought by WPB

Uncle Sam is searching for idle machine tools. The Tools Branch, WPB, is writing thousands of manufacturers urging them to report:

- Idle manufacturing machinery.
- Machinery little or seldom used.
- Damaged machine tools.
- Unused tools and fixtures.

A recent survey of used machine tool dealers disclosed more than 40,000 idle tools. If all manufacturers report machinery that might be used by defense manufacturers, WPB estimates an additional 50,000 tools would be disclosed.

Furthermore, manufacturers who are not doing defense work are urged to get along with as few machines as possible.

Data wanted:

Make, type, size, description, age and condition (excellent, good, fair, or broken). A photograph would be helpful.

Cone or geared head.

Note missing parts, and extra parts.

Present location (address and telephone number of contact). Asking price.

Use 8½ x 11 in. paper, listing only one machine on a sheet. Keep a copy, and note if the machine has been sold on your copy.

Send reports to Available Tools Section, Tools Branch, WPB, Social Security Building, Washington, D. C.

TABLE I—Chemical Composition of Alternate Bronze Casting Alloys

Composition Number	Copper, %	Tin, %	Zinc, %	Lead, %	Iron, % Maximum	Nickel, %	Phosphorus, % Maximum
2	78.0-82.0	2.5-3.25	7.0-10.0	6.0-8.0	0.40	0-1.00	0.05
3	78.0-82.0	2.5-3.25	7.0-10.0	6.0-8.0	0.40	0-1.00	0.05
5	85.0-89.0	7.5-11.0	1.5-4.5	0-1.00	0.25	0-1.00	0.50

TABLE II—Physical Properties of Alternate Bronze Casting Alloys

Composition Number	Tensile Strength Psi, Minimum	Elongation In 2 In. %, Minimum
2	28,000	15
3	28,000	15
5	35,000	18

Rubber Orders Shrink Uses

WITHIN a fortnight of the appointment on March 31 of Arthur B. Newhall as WPB's Coordinator for Rubber, there was a lot of action on the "rubber front" to further control civilian use of rubber.

M-15 (June 20, 1941) was amended again when crude rubber or latex was ordered out of 20 products, and reduced in 50 (Amendment No. 7, March 31).

- Food industry's executives were called to Washington to lay plans for voluntary reduction of deliveries to save rubber (April 21). Definite plans were submitted to WPB by bakers, ice cream manufacturers.
- Supplementary Order M-15-b-1 (April 3) was issued to further control of camelback for tire recapping, and to prohibit certain uses of rubber by the Army – issued at the Army's request.
- Limitation Order L-84 (April 4) curtailing the manufacture of heating pads to save rubber and other material.
- OPA prohibited rubber tires for certain types of farm tractors (April 6).
- WPB proposed specifications for substituting less critical materials for rubber (April 6).
- Replacement of mud and snow tires with summer tires prohibited in most circumstances (April 6).
- First criminal indictments resulting from tire rationing brought a plea of guilty (April 13).
- Amendment No. 1 to General Limitation Order L-43 (April 14) prohibited rubber tires on auxiliary trailers for fire apparatus after that date. Steel-rimmed wheels will be used – unless some better method is developed.
- A statement by Leon Henderson, OPA's director, clearly stated that even war workers will have to prove the necessity for using their cars in getting to work and

he urged all such workers to seek other modes of transportation.

Mr. Newhall has been given the broadest powers ever delegated by Donald M. Nelson, WPB chairman, in the first appointment of a coordinator for any material. A former vice president of Goodrich Tire & Rubber Co., and on leave from his post of executive vice president of Talon, Inc., he continues to supervise the Rubber & Rubber Products Branch, WPB, and also:

- Supervises the Synthetic Rubber Section, Materials Division, WPB.
- Determines policies on priorities and allocation of the material.
- Supervises the work of the Bureau of Industrial Conservation, WPB, in respect to rubber, particularly in salvage, conservation, and substitution. This is to include any enlistment of public support for salvage or conservation.
- Coordinates and supervises all WPB work on military and civilian rubber specifications.
- Coordinates tire and tube rationing by the Office of Price Administration.
- Represents WPB Chairman Nelson at the Reconstruction Finance Corp., or any of its subsidiaries, and the Office of the Petroleum Coordinator for National Defense, with respect to:

1. Synthetic rubber manufacturing facilities.
2. Rubber stockpiles.
3. Buying and selling rubber or its products.
4. Financing additional rubber production facilities.

Thus Mr. Newhall is the nation's rubber and synthetic rubber czar.

Tool Maintenance Is Arms Bottleneck

TODAY'S armanent tooling paradox:

Highly complicated, automatic machine tools – developed during the past decade – are proving a liability on many manufacturing fronts.

Reasons:

Insufficient tool maintenance men are available in shops unused to this type of equipment to keep it running, and

Most new machine hands have been told, or believe, that they are foolproof.

Hence, when the electrical controls or hydraulic mechanisms go wrong, the machine stops and must wait until an experienced maintenance man gets around to start the machine running again.

Furthermore, most government contractors who have a high priority on machine tools, demand the latest, most automatic models – although many of them have had no experience with this type of equipment. These automatics take longer to build than do the older type of machines, and sometimes involve five times the man-hours to complete than do their ancestral counterparts.

"Portee" Cavalry Bows to Machines

The Army's ten combination horse-mechanized Cavalry regiments will become completely mechanized, releasing 5000 horses and giving this fighting arm modern war speed.

They're Saying in Washington...

Arms "Ministry" Gets Setback

OUR War Department has outsmarted the energetic group in Washington plugging for a "ministry of supply" by taking over a large number of WPB's best equipped and most experienced production engineers. They're joining the Army now, either as commissioned officers or civilian experts.

The more violent spokesmen of the "ministry" crowd who have mentioned their respective "candidates" for this top production job – expecting it to carry with it a cabinet appointment – indicate that the battle for power has not been lost, but admit an outflanking. Cautiously some are asking "who is considered by the automotive industry to be as good or better than so-and-so?"

The rapid retooling of the automotive industry to arms production (as soon as contracts were negotiated and orders given) has pulled the cork of the "conversion" element of this group who hailed the reorganization of the Automotive Branch under Ernest C. Kanzler as their masterstroke. Mr. Kanzler's result-producing cooperation with automotive production engineers did not fit the "automotive czar" idea.

Some of these "ministry" supporters now take refuge in saying that there has been found to be a duplication of effort in masterminding the nation's war production program, and predict that these production executives won't like the Army, anyway. Several pointed out that the basic production plans have been established by WPB, and that these men will now be set to the task of getting action on those plans.

It is probable that until the air is cleared, many of these executive engineers who have made their fame in production *won't* like the Army, at that. There is too much of "you do this, Mister" ordering by officers down the line, at the moment.

The facts are:

- Neither the WPB nor the Army has realized that troubleshooting the complex specific problems of the vast production program would become a major task. So many manufacturers are starting in business all over again because the arms products are so unlike the things they have been making and selling during peacetimes, and the ways of doing business with the government are mysterious to most business executives.
- The Army and Navy's inspection setups are inadequate to carry the load, and the conception of inspection has not been anywhere near broad enough. In many cases, type testing (such as ballistic testing) has taken the place of micrometers, gages, and chemical compositions of materials.
- With the freight-car loadings index climbing steadily upward, and with the terrific load on highway transportation, an important part of the troubleshooting is one of transportation. (Lt.-Gen. William S. Knudsen chalked up several strikes recently by cleaning off hundreds of machine tools standing huddled at one end of the production alley.)

At press time it looks like the Army is still in the saddle. The Navy is still on the bridge – giving orders.

Mayari Mysteries Opened By War

STAKED out in claims in the 1880's, and rediscovered by American geologists astride native ponies, large deposits of Cuban nickel ore will be exploited by a $20 million plant just authorized by WPB and financed by the Reconstruction Finance Corp.

Thus World War II focuses metallurgical attention on one of the most fascinating phenomena in the field, the alloyed-by-nature iron ores of Mayari and San Luis, Cuba. The Nicaro Nickel Co., new subsidiary of Freeport Sulphur Co., has developed a process to recover the 1% to 1½% nickel from the iron ore, and started the huge plant before the government contract was signed.

On the vast sierras of northeastern Cuba are rising mining, metallurgical and power plants, and a complete town with schools and hospital for workers. Dredging and new docks are completed already.

Back in the days when the world was a molten mass, iron, nickel, chromium, alumina, silica, and phosphorus were fused in nature's crucible. A peculiarity which makes the reduction of nickel difficult in Mayari ore is the unexplained affinity of these alloying elements. Bethlehem Steel Co. uses this ore extensively, having found that the natural inclusion of the desired alloying elements tends to induce better distribution of added alloys throughout the iron during the melting. It was widely used in engine castings, sheets, plates and rails.

Except for a small amount of nickel recovered from copper salts, the United States has no primary nickel. Canadian deposits are the richest known. New Caledonia (Free French) about 950 miles east of Australia, a little larger than the state of Connecticut, is the world's second largest source. Norway, Russia, Burma, Greece, Germany, Finland, and the Netherlands Indies produce a smattering.

"More precious than gold for winning the war," nickel was one of the first critical metals to be put under control by OPM (M-6, May 15, 1940). This was the first order which outlined the mechanics of allocation of strategic materials. Successive orders have tightened its use – even for the Army and Navy.

War Spending Climbs To New All-Time High

AMERICA'S war effort hit the $36 billion-a-year rate in March, and is expected by WPB experts to hit the $40 billion clip soon. At the low point of the depression in 1932, the country's national income was $40 billion, which is the estimated annual national income of Germany.

The February to March increase of 15%, followed the preceding month's gain of 21% and the December-January jump of 8%. The $3 billion spent in March was 73% greater than that during November – the month before Pearl Harbor – and almost four times the rate of March, 1941.

New booklet, available from local WPB offices, tells what Hitler wants Americans to believe. Its purpose is to expose fifth-columnist tactics at which the Axis is a master.

Track Tractors Are Curtailed

WPB proved to be no respecter of even the farm bloc when it issued an immediate and drastic curtailment of the manufacture of smaller types of tractors, principally used on farms.

The order (L-55-a, April 9) prohibits building tracklaying tractors of from 15 to 75 hp after Sept. 1, and between now and the deadline they may make only 3035, or less than half of the estimated capacity of the four manufacturers.

Furthermore, under a previous order, L-35, no tractor may be sold without authorization of the Farm Equipment Branch, WPB.

The order is designed to hasten output of larger tracklayers needed for military, export, and essential civilian use.

By permitting production of the reduced number, WPB pointed out, manufacturers will be able to balance inventories, build up stocks of spare parts, and use up fabricated critical materials now on hand, in order to buy materials needed for the larger sizes.

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Metal-Spray Worn Parts, ODT Urges

BUILDING up worn automotive parts by metal spraying and then grinding down to correct size, may be the only way to get parts to keep trucks and buses running, William J. Cumming, chief, Vehicle Maintenance Section, Office of Defense Transportation, warns.

A pioneer in this practice, Mr. Cumming has presented facts and experiences to a number of SAE meetings (SAE Journal, April, 1942, Transactions Section, pp. 139-140).

Backed by a number of years of administering this type of salvage-of-worn-parts program for the Surface Transportation Corp., New York, he is convinced that transportation executives who get on the bandwagon of building up worn parts will actually find it profitable.

Asked why he had undertaken this type of salvage work in times of peace, Mr. Cumming told the SAE Journal that he had "inherited" a large number of "orphaned" vehicles, new parts for which were unavailable. However, forced by necessity to try something unheard of, he found that he could extend the technique profitably even to parts which were available for some of the company's newer buses.

"In a total war every vehicle is a part of war transportation," he said.

But, he pointed out, the need for new parts even for direct war transportation does not guarantee getting parts from factories. He predicts that backlogs of parts will be used up rapidly, and vehicle manufacturers will be unable to secure materials to make new parts except for military vehicles.

An SAE member for 22 years, the ODT maintenance chief urges fleet operators and individual owners to:

- Make regular mechanical check-ups of all trucks
- Guard against overloading
- Instruct drivers to make daily checks of the trucks
- Employ only competent drivers
- Conserve worn parts by rebuilding.

Ingenuity Is At Work

FOR months the SAE Journal has been trying to print some of the dramatic retooling stories which have repeatedly pushed armament production far above original estimates and agreements between the government and manufacturers. Too many involve the manufacture of secret products, but:

Plain, old fashioned Yankee ingenuity is winning the war on the factory production lines.

Take the word of a veteran automotive production engineer, a one-time vice president of the SAE, who won't be quoted because he is working for the government.

Unbelievable makeshifts are used to extend lathe beds, and jigs and fixtures are making history.

Despite makeshifts, the end product is coming along fast and within the limits allowed.

IMPACT OF WAR ON INDUSTRY

Victory-Grams

IMPACT OF WAR ON INDUSTRY

ABOUT ONE-HALF OF 3500 FIRMS SURVEYED FOR PRIORITY VIOLATIONS FOUND TO BE NOT GUILTY. MOST OF THE VIOLATIONS RESULTED FROM MISUNDERSTANDING, L. J. MARTIN, WPB PRIORITIES DEPUTY, REPORTED. NOTE: NEW LAW PROVIDES PENALTIES UP TO ONE YEAR AND $10,000 FINE. "FLYING SQUADRON" OF INVESTIGATORS IS ON THE JOB NOW.

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INVENTORY HEADACHE:
LARGE CIGARETTE MAKER CAUGHT WITH $100,000 WORTH OF LEAD FOIL —FORBIDDEN AFTER MAY 1—TRYING TO FIND LEGAL OUTLET. PROBLEM IS THAT FOIL HAS LOW JUNK VALUE.

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CIVIL AIR PATROL, OFFICE OF DEFENSE TRANSPORTATION, ALREADY HAS 38,000 MEMBERS WHO WILL RELIEVE ARMY PILOTS BY FLYING FREIGHT AND PERSONNEL. EARLE L. JOHNSON IS C.A.P. NATIONAL COMMANDER.

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DEPARTMENT OF JUSTICE ENTERED A CONSENT DECREE PROVIDING FREE LICENSING OF PATENTS FOR PRODUCING AND FABRICATING MAGNESIUM.

★

FARMERS WERE ASKED BY ODT TO SUBMIT PLANS FOR POOLING THEIR TRUCKS IN HAULING PRODUCE TO MARKET. REASON:
TO SAVE RUBBER AND GASOLINE.
ODT ESTIMATE:
35 to 50% CUT IN MILEAGE.

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MACHINE-TOOL PRODUCTION HIT ALL-TIME HIGH IN FEBRUARY WITH $93,100,000 VALUE OF 20,307 UNITS. UP 63% FROM JANUARY.

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ANNIVERSARY NOTE:
A YEAR AGO THE SECOND GANO DUNN STEEL REPORT WAS RELEASED, PREDICTING SERIOUS SHORTAGES, AND CITING AUTO PRODUCTION CURTAILMENT AS A HOPE TO SOLVE THE DILEMMA OF AIDING THE ALLIES WITHOUT WAR'S BASIC MATERIAL.

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LT.-GEN. WILLIAM S. KNUDSEN HAS VISITED 170 ARMS PLANTS IN 47 CITIES, IS HOPEFUL THAT PRESIDENT ROOSEVELT'S QUOTAS WILL BE MET, BUT WARNS OF NEED OF CAREFUL PLANNING TO KEEP PRODUCTION FLOWING.

About SAE Members

Former vice president of J. H. Williams & Co., **A. D. ARMITAGE,** has been elected president of that company. His headquarters will continue to be in Buffalo rather than in the general sales offices in New York.

Formerly manager of the Commercial Department, Duramold Aircraft Corp., New York City, **H. V. THADEN** was recently named vice president in charge of production, with the same company.

For nearly 10 years chief engineer of Packard Motor Car Co., **CLYDE RAYMOND PATON** has joined Allison Division, General Motors Corp., as executive engineer on special assignments under **RONALD McKEAN HAZEN,** chief engineer.

Joins Allison

Clyde R. Paton

A former vice president of the Society for the Passenger Car Activity, Mr. Paton has served on a number of research and administrative committees of the Society and was chairman of the Detroit Section, 1935-36.

The appointment of **FRED W. CEDERLEAF** as plant manager of the two Detroit plants of the Republic Aircraft Products Division of the Aviation Corp. was announced recently by William F. Wise, executive vice president of the corporation. Formerly Mr. Cederleaf was works manager of the Dodge Mfg. Corp., Mishawaka, Ind. Prior to that he was manager of the machinery division of the Ex-Cell-O Corp., Detroit; from 1923 to 1935 with General Motors Corp. as consulting engineer in the AC Spark Plug Division; assistant works manager of Olds Motor Works; works manager of the Muncie products division; manufacturing research manager, Buick Motor Division; and manager of Central Standards of General Motors of Canada. Mr. Cederleaf has been a member of the Society since 1919, and in 1933 was vice president representing the Production Activity. He has been active on the Production Activity Committee, and has been SAE alternate representative on the ASME Committee on Cutting of Metals for the past five years.

Leaves Milwaukee Section

G. C. Wilson

Former chairman of the Milwaukee Section, **G. C. WILSON** recently resigned his associate professorship at the University of Wisconsin, Madison, to become assistant to **JOHN SHEPARD BOGEN,** supervising automotive and aircraft engineer, Universal Oil Products Co., Riverside, Ill. He is shown here in the company's laboratory.

HAROLD P. WADE will manage Adel Precision Products Corp.'s new Detroit engineering office. He was at one time an executive engineer for the Packard Motor Car Co., and the Chrysler Corp.

F. LEROY HILL recently became president and general manager of the Aero Screw Co. and the Aircraft Electric Co., Rockford, Ill. The former company manufactures aircraft hardware; the latter company manufactures electrical accessory equipment for aircraft. His former position was with Air Associates, Inc., Bendix, N. J., where he held a similar position.

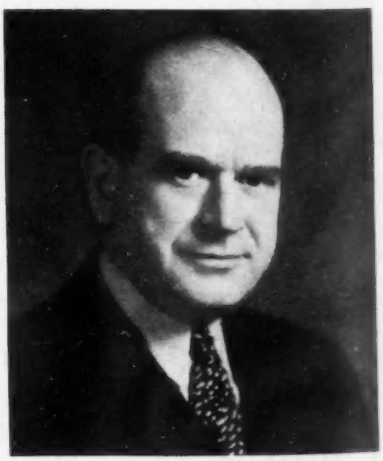
JOHN F. CREAMER, president and general manager of Wheels, Incorporated, New York and Newark, has resigned from the organization which he founded over 20 years ago to become associate director of procurement, Motor Transport Division, Quartermaster Corps. An artillery officer veteran of five major engagements in World War I, Mr. Creamer resigned his vice presidency of the National Wheel & Rim Association and many committee assignments in the Motor & Equipment Wholesalers Association and the Automotive Electric Association. He was a director of the West Side Association of Commerce in New York City, and the Clinton Trust Co. He was chairman of the Automotive Educational Commission of the Board of Education, and devoted many years to planning the $3,000,000 Brooklyn High School of Automotive Trades – the outstanding institution of its type in this country. He was chairman of the SAE Metropolitan Section in 1932.

HERBERT CHASE recently joined the staff of McGraw-Hill's *Aviation* magazine as production editor. A veteran writer on design and manufacturing problems of the automotive industry, he has been a member of the Society for more than 30 years and served as treasurer for two years, and was at one time assistant secretary of the Society in charge of its World War I Washington office. He is a member of the Metropolitan Section Governing Board, and was one of the organizers of that Section. He is the author of a number of technical books, and was previously associated with *Product Engineering* and *American Machinist*. Soon after the last war he was engineering editor of *Automotive Industries*.

MAURICE J. ZUCROW is now connected with the Elliott Company, Jeannette, Pa., as research and development engineer. This company is engaged in the manufacture of power plant machinery. Prior to this he was vice president, Ring Balance Instrument Co., Chicago.

Vice President **JEAN Y. RAY,** of the SAE T&M Activity Committee, has appointed **J. WILLARD LORD** to head the new subcommittee to study "Standard Practice Instructions." At a preliminary meeting of this subcommittee at the Interstate Commerce Commission Building, Washington, March 25, the following scope was developed and approved:

The purpose of this subcommittee is to: Determine the most desirable method, form, etc., of presenting Standard Practice Instructions for maintenance; promote acceptance among parts, vehicle and shop equipment manufacturers and induce said manufacturers to produce sample instructions; promote the use of Standard Practice Instructions among all maintenance establishments as a medium for training mechanics and for reference by mechanics in actually performing maintenance operations. This work has been requested of the Society by several government agencies.



George H. Kublin

Formerly assistant chief engineer, General Motors Overseas Operations, Detroit, **GEORGE H. KUBLIN** recently became chief engineer of the Tank Section, Fisher Body Division, General Motors Corp., Detroit, makers of medium and heavy tanks.

Formerly special representative, General Motors Truck & Coach Division, Boston, **WILLIAM F. MAGUIRE** recently became

purchasing agent for the Raytheon Mfg. Co., Watertown, Mass., manufacturers of radio tubes and electronic equipment.

ROGER G. DeLONG has been transferred from sales engineer, hydraulic department, Racine, Wis., to installation engineer, Twin Disc Clutch Co., Rockford, Ill.

W. E. **BAPTIST** has left de Havilland Aircraft Pty., Ltd., New South Wales, Australia, where he was chief inspector in the airscrew division, and is now with National Motor Springs, Pty., Ltd., N.S.W., as chief inspector in the aircraft parts division.

THOMAS G. MUIR is technical editor of the *Commercial Car Journal*, Philadelphia. He was formerly field supervisor, automotive transport department, Atlantic Refining Co., of that city. Mr. Muir takes over the editorial position recently vacated by Henry Jennings, the latter having joined the SAE headquarters staff to direct T&M activities.

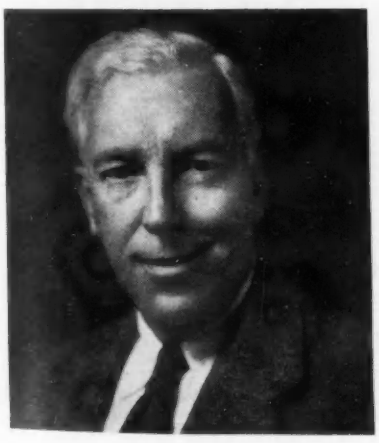
Transfer of **HARRY FRANCIS WOOD** from designing layout draftsman to layout draftsman and special assignments recently took place in the Nash Motors Division, Nash-Kelvinator Corp., Kenosha, Wis.

Formerly a Michigan State College student, **E. CLARKE CAMPBELL** is now with Olds Motor Works, Division of General Motors Corp., Lansing, Mich.

EDMUND J. ZEGLEN is now connected with the Ex-Cell-O Corp., Dearborn, Mich. Formerly he was a student at the Detroit Institute of Technology.

In a recent national broadcast, SAE member **C. E. WILSON,** president of General Motors Corp., said that "we have made faster progress on our war production than we had even hoped to make." His speech was designed as a report to the public on war production by the industry. Of General Motors' 90 factories, he said that 86 are already either producing war material or are being rearranged and retooled for war production.

Now With ODT



W. J. Cumming

W. J. **CUMMING** is now chief of the Maintenance Section, Office of Defense Transportation, Washington. He is on leave of absence from his position of automotive engineer in charge of maintenance, Surface Transportation Corp., New York City. He has just been appointed chairman of the Society's T&M Coordinating Committee.

FRANCIS W. Du LYN has left United Airlines Transport Corp., Chicago, where he was project engineer, to become installation engineer with Pratt & Whitney Aircraft Division, United Aircraft Corp., East Hartford, Conn.

JOHN F. YOUNG, who had been service division manager, Ford Motor Co., Long Beach, Calif., recently became master mechanic, flight test department, in the Willow Run Bomber Plant of the Ford Motor Co., Ypsilanti, Mich., where they are manufacturing B24 heavy bombers and aircraft parts.

As an instructor in engineering defense training courses, **C. A. WITHINGTON, JR.,** recently joined the staff of the University of California, Berkeley, Calif. Formerly he was connected with Tidewater Associated Oil Co., Associated, Calif., where he was a research engineer in the automotive laboratory.

Former University of Wisconsin student **ROBERT C. ENGER** recently became connected with the Linde Air Products Co., Tonawanda, N. Y., in the capacity of mechanical engineer.

Joins Eastern Aircraft

William J. Tell

Formerly chief body engineer, Cadillac Motor Car Division, General Motors Corp., Detroit, **WILLIAM J. TELL** recently joined Eastern Aircraft-Linden Division, General Motors Corp., Linden, N. J., in the position of chief engineer.

O. E. EGGEN, who was chief engineer, Oliver Farm Equipment Co., Charles City, Iowa, has been named plant manager of the same company.

MERRILL T. CLARK has been named vice president and sales manager of the Tuckett Printing & Lithography Co., Seattle, Wash. He was formerly sales and service engineer, Laher Spring & Tire Corp., Portland, Ore.

Former University of Wisconsin student **EDWARD R. HEAGLE** recently became transient test engineer, General Electric Co., Schenectady, N. Y.

Formerly transportation engineer, International Harvester Co., Inc., Chicago, **EUGENE L. MENCH, JR.,** has joined the engineering department of Holabird Quartermaster Motor Base as senior automotive engineer. This civilian connection is for the duration of the war.

Hudson Vice President

H. M. Northrup

H. M. NORTHRUP, formerly chief engineer, has been elected vice president of Hudson Motor Car Co., Detroit. He joined Hudson in 1920 as assistant metallurgist; became chief engineer in 1936. Mr. Northrup has been a member of the Society since 1917, and has been particularly active in the Automobile Division of the Extreme-Pressure Lubricants Research Committee, the Lubricants Division of the Standards Committee, the Passenger Car Division of the Standards Committee, and SAE representative on ASTM Technical Committee A on Automotive Rubber. He has been a member of the SAE War Engineering Board since its inception last year, and recently was appointed SAE-WEB engineering liaison representative on the Artillery Product Division of the Automotive Council for War Production.

MILTON ROBERTS has left the Cummins Diesel Engine Corp. of N. Y., where he was sales engineer, to become assistant secretary-treasurer, Hill Diesel Engine Co., Lansing, Mich., manufacturers of diesel engines.

Promotion of **JOHN CLIFFORD POPE** from department manager to manager of the gasoline testing division, Ethyl Gasoline Corp., New York City, recently took place.

WALLACE BLANCHARD, JR., is in the Aeroproducts Division of General Motors Corp., Tipp City, Ohio. Before joining GM, he was a Massachusetts Institute of Technology student.

The Airplane Division of the Curtiss-Wright Corp. has recently appointed **DR. NORTON B. MOORE** as director of aerodynamic research. Dr. Moore, formerly chief research engineer, St. Louis Airplane Division of the same company, will be headquartered in Buffalo.

C. A. BIERLEIN, who had been foreman, injector and fuel pump department, General Motors Corp., Cleveland, has been promoted to the position of assistant production engineer, Cleveland Diesel Engine Division of the same company.

GEORGE MONTAGUE WILLIAMS has secured leave of absence from his position of president and general manager of the Russell Mfg. Co., Middletown, Conn., and is now engaged in war work. For the duration he is vice chairman, Vultee Aircraft, Inc., with headquarters at Nashville, Tenn.

T. W. HALLERBERG, formerly a defense representative with the United Specialties Co., Chicago, now is owner of the Master Specialties Co., the same city. The company manufactures flexible hose assemblies for aircraft.

Russell R. Vought

RUSSELL R. VOUGHT, who has been West Coast representative, Vought-Sikorsky Aircraft Division, United Aircraft Corp., Stratford, Conn., recently became vice president and West Coast general manager of United Aircraft Service Corp., a subsidiary of United Aircraft Corp.

M. E. NUTTILA, superintendent of motor vehicles, Cities Service Oil Co., New York City, has taken over the chairmanship of Committee C of the SAE Transportation and Maintenance Activity Committee, succeeding **G. D. GILBERT.** The committee is in charge of "Fleet Management Problems," and has six subcommittees. Mr. Nuttila has served several terms on the Metropolitan Section Governing Board.

Formerly a University of California student, and more recently with the Union Diesel Engine Co., Oakland, Calif., where he was an engineer, **STEVEN W. LEONG** is instructing in airplane engines and structures for the government.

Transfer of **W. R. HAMER** from General Motors of Mexico, Mexico City, to General Motors India, Ltd., Bombay, recently took place.

VINCENT F. WESTLAKE, formerly part owner of Westlake Brothers, Fords, N. J., a coal and ice business, is now a U. S. Navy inspector at Foster Wheeler Corp., Carteret, N. J.

LAWRENCE MYRON FALK is now a draftsman with the Audio Productions Co., New York City. Formerly he was a student at the College of City of New York.

Former University of Wisconsin student **EDWIN L. FISHER** recently joined Fairbanks, Morse & Co., Beloit, Wis. He is a tester in the experimental department.

ROBERT L. MILLER is now an engineer in the Chesapeake & Potomac Telephone Co., Washington. He had been national accounts representative for the Autocar Sales & Service Co., New York City.

JOSEPH GESCHELIN, vice president of the SAE for Production Activity and Detroit editor, Chilton Co., recently completed a heavy speaking schedule on the retooling of the automotive industry for arms production. His engagements were in Toledo, Windsor, Ont., Muskegon, and Philadelphia.

Promotion of **MILTON BREITMAN** from draftsman to liaison engineer recently took place at Vought-Sikorsky Aircraft, Division of United Aircraft Corp., Stratford, Conn.

RODOLPHE STAHL has been elected president of Ciro, Inc., Detroit, manufacturers of two-lens reflex cameras and machinery parts for armament. He had been consulting engineer, Saylor-Beall Mfg. Co., Detroit.

WOODROW M. LUCAS, former University of Wisconsin student, has joined the engine test department of Electro-Motive Corp., Division of General Motors, La Grange, Ill.

ALBERT W. JORDAN has been ordered into active service as a first lieutenant, coast artillery. Formerly he was experimental engineer, Waukesha Motor Co., Waukesha, Wis.

Former engineering draftsman, Kenworth Motor Truck Corp., Seattle, **LT. R. D. CONRAD** is in service in the U. S. Army, Battery A, third coast artillery, Fort McArthur, Calif.

JAMES M. McINERNEY, formerly maintenance engineer, McInerney Spring & Wire Co., Grand Rapids, Mich., is with the Shipbuilding Branch of the War Production Board, Washington, as associate industrial specialist.

ROLAND S. ELY, formerly Michigan State College student, is now experimental test engineer, Pratt & Whitney Aircraft, Division of United Aircraft Corp., East Hartford, Conn.

C. N. THOMPSON, A. O. Smith Corp., has been transferred from engineering representative, Detroit, to the engineering records division, Milwaukee, Wis.

CHARLES O. BECH is now a layout draftsman, Cummins Diesel Engine Corp., New York City. He was formerly garage superintendent, Ward Baking Co., Newark, N. J.

EDWIN K. SMITH is a senior metallurgist in the U. S. Ordnance Department, Tank and Combat Vehicle Division, Washington. He was formerly with the Electro Metallurgical Co., Detroit, as service metallurgist.

F. BRINT EDWARDS, who had been an engineer in the power plant group, Curtiss-Wright Corp., St. Louis Airplane Division, Robertson, Mo., is now general design engineer, Vega Aircraft Corp., Lockheed Air Terminal, Burbank, Calif.

Formerly works manager, National Motor Springs Pty., Ltd., Alexandria, New South Wales, Australia, **ROBERT JOHN CROCKETT** became works manager of Gilbert & Barker Mfg. Co. Pty., Ltd., N.S.W.

Formerly assistant manager, aviation department, Shell Oil Co., Inc., New York City, **LT. A. J. M. HAMON** is now with the Navy Bureau of Aeronautics, Washington, D. C.

J. L. LITTLETON recently severed connections with the Simplex Products Corp., Cleveland, with whom he was associated for 18 years, and is now serving on the War Production Board as field engineer in the Cleveland office. He had been sales and service territory manager with the Simplex company.

W. REX BRASHEAR is in the War Department, St. Louis Ordnance District, as assistant engineer. Formerly he was in the purchasing department of the Emerson Electric Mfg. Co., St. Louis, Mo.

ROBERT GUY HALL was recently promoted from zone manager, Tulsa, Okla., to service and maintenance supervisor, fleet sales division, General Motors Corp., Detroit.

Formerly a designer, Warner Aircraft Corp., Detroit, and more recently with Ranger Aircraft Engines, Farmingdale, L. I., N. Y., in the same capacity, **WALTER E. SCHMIDT** is now with the former company as liaison engineer.

ALFRED M. BECKER recently joined the Chandler-Evans Co., South Meriden, Conn., as a service engineer. He was formerly with American Bosch Corp., Springfield, Mass., in the same capacity.

Former Ohio State University student **WAYNE R. HOWARD** is now working for the White Motor Co., Cleveland.

DAVID L. DAVIS, a test engineer in the Paterson, N. J., plant of Wright Aeronautical Corp., has been transferred to the Cincinnati plant of the company.

ROBERT E. WILSON, president and director, Pan American Petroleum & Transport Co., has been appointed a member of the board of managing directors of the General Aniline & Film Corp. by Secretary of the Treasury Morgenthau. The corporation is in the hands of Alien Property Custodian Crowley. Robert E. McConnell, who will serve as president and chairman of Analine, is also chairman of the Engineers' Defense Board, on which are serving several SAE members, and is a consultant of WPB. Other members named by Secretary Morgenthau are: A. E. Marshall, president,

Robert E. Wilson

Rumford Chemical Co., and George Moffett, chairman, Corn Products Refining Co. The present board has been asked by the government to resign.

FRANK A. SHARPE, formerly in the sales department, Friction Division, Inland Mfg. Division, General Motors Corp., Dayton, is now with the Mid-West Abrasive Co., Detroit.

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In Military Services

LT.-COL. **B. J. LEMON** is in the U. S. Army, Motor Transport Division, Quartermaster Corps, Washington.

LT.-COL. **EMERSON LEROY CUMMINGS** is now in the Ordnance Department, U. S. Army, Washington, as chief of the engineering section, Tank Division, Industrial Service. Formerly he was a captain in the Artillery Division, Industrial Service, Ordnance Department, U. S. Army, Washington.

LT.-COM. **LEWIS K. MARSHALL, USNR,** is with the Bureau of Aeronautics, Production Engineering Section, Washington. Lt.-Com. Marshall had been general service manager, Pontiac Motor Division, General Motors Sales Corp., Pontiac, Mich.

A leave of absence has been granted **GEORGE A. JEWELL** from the Ward Motor Vehicle Co., Mount Vernon, N. Y., where he was an engineer, in order for him to serve in the U. S. Army, Signal Corps Laboratories, Fort Monmouth, N. J., as associate mechanical engineer. His assignment is to inspect the various plants developing, and building equipment for Signal Corps use.

HARRY PRICE, formerly a patent lawyer, New York City, now is a captain in the U. S. Army, Office of Chief of Ordnance, Washington.

Major H. P. Whitcamp

Two new honors have been accorded **MAJOR H. P. WHITCAMP:** his appointment as automotive officer of the Sixth Corps Area, embracing the states of Illinois, Michigan, and Wisconsin; and his promotion from captain to major. He brings to his new post more than 10 years of experience in Army motor transport operation and direction. Major Whitcamp maintains headquarters at the Sixth Corps Area Quartermaster Office, Chicago.

LT.-COL. **FRANK J. HIERHOLZER,** formerly in the Department of Motor Transport, Staff and Faculty, Fort Sill, Okla., where he was a major and an instructor, has been promoted and transferred to the Automotive Section, Services of Supply, Office of the Chief of Staff, War Department, Washington.

JOHN H. MILLAR is a lieutenant in the British Air Commission, Royal Navy Office, Washington. He is in charge of maintenance and repair of American aircraft with the Royal Navy.

FREDRICK EWAN MOSKOVICS, formerly in the U. S. Army, Air Corps, Wright Field, Dayton, recently became technical adviser to the supervisor, Army Air Forces, Materiel Center, Central Procurement District, Detroit.

LINWOOD F. MILLEN, who was a senior engineering draftsman, U. S. Navy, Norfolk Navy Yard, Portsmouth, Va., is now weight control engineer at Bell Aircraft Corp., Buffalo.

Herbert J. Greenberg

HERBERT J. GREENBERG is an aviation cadet at the U. S. Naval Air Station, Jacksonville, Fla. Before enlisting in the Naval Air Corps he was employed at Hamilton Standard Propellers, Division of United Aircraft Corp., as experimental blade designer.

LT.-COM. **A. LINCOLN BAIRD,** U. S. Navy, Bureau of Aeronautics, Washington, has been promoted from the rank of lieutenant. He was formerly stationed at the Naval Air Station, Pensacola, Fla., in the assembly and repair department, where he was process superintendent.

CAPT. **W. KOELLIKER** has been granted a leave of absence from the Scintilla Magneto Division, Bendix Aviation Corp., Sidney, N. Y., where he was an engineer. He is in the U. S. Army Air Force, New York City, as production engineer.

Formerly an engineer, Waukesha Motor Co., Waukesha, Wis., **LT. ROYCE CHILDS** is now in the U. S. Army, Ordnance Department, Rock Island Arsenal, Rock Island, Ill. He is a tank maintenance officer.

WALTER H. KENNETT has been promoted from major to lieutenant colonel, and is stationed at Fort Lewis, Washington.

A leave of absence has been granted **J. A. DOYLE,** New York manager, Sun Mfg. Co., Chicago, in order that he work on a special assignment in the War Department, Motor Transport Corps, Washington. **A. C. SANFORD,** formerly sales engineer with the same company, has been appointed Mr. Doyle's successor as New York manager.

Former University of Illinois student **WILBUR MARCUS** is now an ensign in the U. S. Naval Academy post graduate school, Annapolis, Md.

SAMUEL NOOGER has been advanced from junior mechanical engineer to assistant mechanical engineer, War Department Army Air Forces, Materiel Center, Wright Field, Dayton. He works on specifications in the Army-Navy Aeronautical Specifications Branch of the Production Engineering Section.

Formerly chief of materiel, Douglas Aircraft Co., Inc., Santa Monica, Calif., **LT. W. A. HAMILTON** is now in the U. S. Navy, Bureau of Aeronautics, Washington.

WALLACE BRENNAN is a first lieutenant in the U. S. Army, staff of the Quartermaster Motor Transport School, Port of Stockton, Calif. Formerly he was in the C.C.C. Motor Repair Division, inspection training, Salem, Ore.

Formerly a Massachusetts Institute of Technology student, **LEONHARD KATZ** is in active service in the H.Q. Company, 70th Tank Battalion, Fort Bragg, N. C.

PIERRE STUART de BEAUMONT is an ensign in the Production Engineering Section, Materiel Division, Bureau of Aeronautics, Navy Department, Washington. Formerly he was staff assistant on defense materials, relationship staff, General Motors Corp., New York City.

STEPHEN M. BATORI recently went into active duty in the U. S. Army as a first lieutenant, Ordnance Department, First Infantry Division, Camp Blanding, Fla. Previous to entering the service he was with the Sun Oil Co., Boston, where he was regional supervisor of automotive equipment.

HARRY O. MATHEWS is now a major in the U. S. Army Motor Transport Division, Quartermaster Corps, Washington. Formerly he was automotive engineer, Public Utility Engineering & Service Corp., Chicago, and also a vice president of the T&M Activity and chairman of the T&M Coordinating Committee.

ALONZO P. MERCIER is a captain in the U. S. Army, 208th coast artillery, San Francisco, Calif. He had been plans and training officer, 208th coast artillery, Camp Edwards, Mass.

LT. **ERIK HOFMAN** is in the Navy Bureau of Aeronautics, Washington. Prior to this he was technical supervisor, International Aviation Associates, London, England.

Squadron Leader **JOHN BURT FLYNN** is chief engineer officer, 34th Elementary Flying Training School, Royal Air Force, Assiniboia, Sask., Canada. He was formerly a flight lieutenant in the Engineers Branch of the Royal Air Force, London, England.

WALTER HERBERT ZIEGLER has been called to active duty in the Ordnance Department of the U. S. Army, Aberdeen Proving Ground, Md. He is a second lieutenant. Formerly he was a junior engineer with Wright Aeronautical Corp., Paterson, N. J.

ROBERT L. STIX has been appointed an aviation cadet, U. S. Navy, Naval Air Station, Jacksonville, Fla. Formerly he was in preliminary flight training, U. S. Naval Air Corps, New York Naval Air Base, Brooklyn.

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Obituaries

Walter M. Nones

Walter M. Nones of Southpoft, Conn., and the Hotel Carlyle, New York City, who retired in 1941 as president and chairman of the board of the Norma-Hoffmann Bearings Corp., Stamford, Conn., which he founded in 1914, died March 10 in the Doctors Hospital after a brief illness. He was 67.

In the first World War, Mr. Nones was a member of the War Industries Board and chairman of the War Service Committee for the ball bearing and steel ball industry, representing the industry for all requirements of the United States and its Allies.

Herrman A. Schatz

Herrman A. Schatz, president of the Schatz Mfg. Co., and the Federal Bearings Co., Inc., Poughkeepsie, N. Y., died on March 16. He was 65 years of age. Mr. Schatz was one of the pioneers in the ball bearing industry, and for more than 47 years had been engaged in the manufacture of fine ball bearings for motor cars, aircraft and industrial purposes. The capable and efficient organization developed by Mr. Schatz remains intact, including executives, engineers, and personnel. He joined the Society 29 years ago.

Mr. Schatz was also secretary and treasurer of the Waterbury Steel Ball Co., Inc., Waterbury, Conn., and vice president and a director of the First National Bank of Poughkeepsie, N. Y.

John M. O'Malley

John M. O'Malley, superintendent of equipment, California Department of Public Works, Division of Highways, Sacramento, died March 6, 1942, of a heart ailment, at the age of 67. He was a native of Hartford, Conn., where he was at one time a toolmaker, and in the automobile testing and experimental departments of the Pope Mfg. Co. In this connection he drove the Portola model *Pope* in the first Vanderbilt Cup Races. Upon closing of the Pope factory, he joined the Sturtevant Aeroplane Co., Boston; then he became attached to the U. S. Army Signal Corps as aeronautical engineer, and held this position until 1922. From 1922 to 1926 he was rehabilitation officer for the Southern California District of the Veterans Vocational Training Bureau, at which time he joined the State Highway equipment department. He was a member of the Society since 1917. He was particularly active as president, delegate, and chairman on various committees for the California State Employee's Association.

George Burrell

George Burrell died in an airplane accident on March 26 when the new pursuit plane he was testing crashed and burned at Westbury, L. I., N. Y. At the time of his death he was operations manager of Republic Aviation Corp., Farmingdale, L. I., N. Y., and as such was responsible for all flying operations on experimental and production airplanes, as well as servicing adjustments and pre-flight inspections of airplanes awaiting delivery. He had recently been promoted to this post after serving several years as chief test pilot. As a test pilot, his judgment on aerodynamic questions was highly respected, and his recommendations contributed greatly to the success of several Republic models. He was nationally recognized for his part in the development of equipment for recording flight test data photographically. He was 40 years old.

SAE Coming Events

Sept. 24 – 25 National Tractor Meeting
Hotel Schroeder – Milwaukee, Wis.

Baltimore – May 14

Engineers Club; dinner 6.30 p.m. The Thermoid Talking Movie "Keep 'Em Holding." Speaker: M. R. Wolfe, district manager, Thermoid Co.

Chicago – May 5

Knickerbocker Hotel; dinner 6:45 p.m. Flight Testing of Service Aircraft – Ralph S. Johnson, flight test engineer, United Air Lines Transport Corp.

Detroit – May 11

Horace H. Rackham Educational Memorial Bldg. Designing Aircraft for War Production – Don R. Berlin, aeronautical engineer, General Motors Corp.

Metropolitan – May 14

Park Central Hotel, New York City; dinner 6:30 p.m. Transportation and Maintenance meeting.

Milwaukee – May 22

Wisconsin Club; dinner 6:30 p.m. Annual Ladies Night.

New England – May 14

Engineers Club, Boston; dinner 6:30 p.m. Transportation and Maintenance Symposium led by James T. Sullivan, automobile editor, *Boston Globe*. Transportation – William M. Clark. Service Problems – Alfred Markus. Ignition – Joe Postal. Economical Operation – Lucius Ryce. Death, by Design – Arthur W. Stevens. Carburetion – M. R. Wolfard.

Northern California – May 12

Hotel Leamington, Oakland; dinner 6:30 p.m. Subject: Aviation.

Northwest – May 14

Seattle Transit Cafe, Seattle; dinner 7:00 p.m. Inspection trip of Seattle Transit Systems Operations. Talk by Ed Cahill.

Oregon – May 8

Lloyds Golf Club, Portland; dinner 6:45 p.m. Presentation of Student Papers.

Southern California – May 1, 2 and 8

May 1 – Elks Club, Los Angeles; dinner 6:30 p.m. Tractor Maintenance Symposium led by Halsey W. Thayer, superintendent of equipment, City of Los Angeles, Department of Water & Power. Speakers: Roy Mayo, service manager, Caterpillar Tractor Co. R. C. Hembree, field service manager, International Harvester Co. L. H. Heineman, service manager, Allis-Chalmers Mfg. Co. Motion Picture by International Harvester Co.

May 2 – Elks Club, Los Angeles; luncheon 12:30 p.m. Power Application Symposium led by Brint Edwards, general design engineer, Vega Aircraft Corp. Advantages of Diesel Power in Aircraft – aero engineering student, Aero Industries Technical Institute. Propeller Control – John D. Waugh, Propeller Division, Curtiss-Wright Technical Institute. Use of the P/H Indicator – Norman Parrish, student mechanical engineer, University of Southern California. Motion Picture "Unfinished Rainbows" by Aluminum Co. of America.

May 8 – San Diego Hotel, San Diego; dinner 6:30 p.m. Engineering Aspects of Aircraft Exhaust Systems – Ralph L. Haver, design engineer, Ryan Aeronautical Co. Flow Production as Applied to the Manufacture of Exhaust Systems – Ernest A. Moore, factory superintendent, Ryan Aeronautical Co. Chemicals That Aid the Processing of Metals in Aircraft Construction – Ray Sanders, vice president and general manager, Turco Products Co.

Syracuse – No meeting

Washington – May 12

Lee Sheraton Hotel, Washington, D. C.; dinner 6:30 p.m. Military Use of Small Planes – Speaker to be announced.

APPLICATIONS Received

The applications for membership received between March 15, 1942, and April 15, 1942, are listed below. The members of the Society are urged to send any pertinent information with regard to those listed which the Council should have for consideration prior to their election. It is requested that such communications from members be sent promptly.

Baltimore Section

Lieb, John Stevens, Lt., U. S. Army, Ordnance Department, Aberdeen Proving Ground, Md.

Buffalo Section

Kellogg, Robert C., engineer, Bell Aircraft Corp., Buffalo.

Canadian Section

Adams, A. Herb, vice president, J. C. Adams Co., Ltd., Toronto, Ont.

Gillespie, Samuel, general manager, Kingsley Mfg. Co., Ltd., West Hill, Ont.

Gung, Simon F., senior aircraft draftsman, The de Havilland Aircraft of Canada, Ltd., Toronto, Ont.

New, Frederick William, head machinist, Ace Automotive Parts & Machine Co., Toronto.

Sims, A. G., supervisor, engine overhaul division, Department of Munitions & Supply, Ottawa, Ont.

Williams, A. Wesley, salesman, Link-Belt Ltd., Toronto, Ont.

Chicago Section

Allyn, Jerome D., junior customer contact engineer, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.

Hodgkinson, Robert W., sales engineer, DeLuxe Products Corp., Inc., La Porte, Ind.

Hoffman, Max, sales engineer, American Bosch Corp., Chicago.

Leiner, Henry G., engine trouble shooting, aviation engine plant, Buick Motor Division, General Motors Corp., Melrose Park, Ill.

Lewark, Robert J., carburetor test engineer, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.

Loch, Joseph, junior inspector-trainee, U. S. Army, War Department, Chicago Ordnance District, Chicago.

Suliss, Stanlev. co-operative fuels research engineer, Sinclair Refining Co., East Chicago, Ind.

Dayton Section

Breitenbach, Robert George, production engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Lockland, Ohio.

Drees, Paul C., automotive maintenance superintendent, Kroger Grocery & Baking Co., Cincinnati, Ohio.

Haynes, Clyde G., maintenance, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Lockland, Ohio.

Miller, E. L., chief engineer, Dayton Steel Foundry Co., Dayton.

Stoner, M. LeRoy, lead engineer, equipment, Curtiss-Wright Corp., Columbus, Ohio.

Withers, Cleemann, executive vice president, United Aircraft Products, Inc., Dayton.

Detroit Section

Child, L. Wallace, chief engineer, Evans Products Co., Detroit.

Denman, Harry B., chief chemist, Detroit Gasket & Mfg. Co., Detroit.

Douglas, Raymond Mills, executive engineer, Pioneer Engineering & Mfg. Co., Detroit.

Kasten, Walter, chief engineer, Skinner Purifiers, Inc., Detroit.

Knight, Louis Walter, chassis designer, Chrysler Corp., Highland Park, Mich.

Raviolo, Victor G., project engineer, Ford Motor Co., Dearborn, Mich.

Sintz, Edward C., junior project engineer, Cadillac Motor Car Division, General Motors Corp., Detroit.

Turner, Charles P., Lt., U. S. Army, Air Corps, Detroit.

Indiana Section

Henry, Millard M., engineer, Delco-Remy Division, General Motors Corp., Anderson, Ind.

Mitchell, J. E., metallurgist, Marmon-Herrington Co., Inc., Indianapolis.

Murray, William Hughes, junior test engineer, Allison Division, General Motors Corp., Indianapolis.

Smethers, John H., road test observer, International Harvester Co., Fort Wayne, Ind.

Metropolitan Section

Bohmer, Charles W., Jr., lubrication engineer, Standard Oil Co. of N. J., New York City.

Buckley, John L., engineer, development department, U. S. Rubber Co., Passaic, N. J.

Coon, Seneca G., Jr., design draftsman, Mack Mfg. Corp., Plainfield, N. J.

Cravens, Benjamin B., transportation engineer, Liebmann Breweries, Inc., Brooklyn, N. Y.

Hazard, Donald M., senior test engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Healy, Alfred A., production engineer, Brevaire & Co., New York City.

Heath, Armour R., Jr., project engineer, Titeflex Metal Hose Co., Newark, N. J.

Hilburg, Max, motor vehicle inspector, War Department, Holabird Quartermaster Depot, Baltimore, Md. Mail: 500 Southern Blvd., Bronx, N. Y.

Hug, Harris C., field engineer, Wright Aeronautical Corp., division of Curtiss-Wright Corp., Paterson, N. J.

Hunt, Clarence G., laboratory mechanician, Socony-Vacuum Oil Co., Inc., Paulsboro, N. J.

Hussey, Frederick K., president, Aeroflex Laboratories, Inc., Long Island City, N. Y.

Marder, John F., engineer, Titeflex Metal Hose Co., Newark, N. J.

Robinson, Cecil S., owner and president, C. S. Robinson Aerial Surveys, Long Island City, N. Y.

Sheinbaum, Herbert H., technical consultant, Ackerman-Gould Corp., New York City.

Milwaukee Section

Dixon, E. O., chief metallurgist, Ladish Drop Forge Co., Cudahy, Wis.

Seaman, H. J., owner, Seaman Motors, Milwaukee.

Viall, G. K., vice president, Chain Belt Co., Milwaukee.

Webber, John A., metallurgical engineer, Interstate Drop Forge Co., Milwaukee.

New England Section

Hourihan, Timothy Joseph, transportation superintendent, Moulton & Holmes, Boston.

King, George Tiffany, Capt., U. S. Army, Headquarters First Corps Area, Boston.

Northwest Section

Bruce, Albert G., tune up and service salesman, Northwest Motors, Inc., Seattle, Wash.

Bullock, Alden D., Kenworth Motor Truck Corp., Seattle, Wash.

Davidson, Arthur Leslie, service engineer, Van Norman Machine Tool Co., Seattle, Wash.

Fruehauf, Herman P., production foreman, Kenworth Motor Truck Corp, Seattle, Wash.

Kanehl, Hugh P., fleet superintendent, Inland Motor Freight, Spokane, Wash.

Lidral, John Packard, mechanical engineer, Boeing Aircraft Co., Seattle, Wash.

Olds, Robert H., power plant engineer, Boeing Aircraft Co., Seattle, Wash.

Peterson, Lewis H., sales engineer, Kenworth Motor Truck Corp., Seattle, Wash.

Riding, Charles H., sales representative, Buda Co., Seattle, Wash.

Spanier, Ansel, zone service manager, General Motors Truck & Coach Division, Yellow Truck & Coach Mfg. Co., Seattle, Wash.

Northern California Section

Berry, Benjamin M., research engineer, Standard Oil Co. of Calif., Richmond, Calif.

Brockwell, Lloyd Alfred, junior engineer, Shell Development Co., Emeryville, Calif.

Stanly, Albert L., research engineer, Shell Development Co., Emeryville, Calif.

Steck, Gordon E., mechanical engineer, Hall-Scott Motor Car Co., Berkeley, Calif.

Wheeler, Grant M., research engineer, Tide Water Associated Oil Co., Associated, Calif.

Wilkes, B. Furman, junior research engineer, Shell Development Co., Emeryville, Calif.

Philadelphia Section

Benning, Walter F., automotive designer, Mack Mfg. Corp., Allentown, Pa.

Boyle, F. J., Ensign, USNR, assistant shop superintendent, Naval Aircraft Factory, Navy Yard, Philadelphia.

Egger, Ray H., bus engineer, Mack Mfg. Corp., Allentown, Pa.

St. Louis Section

Pikus, John H., instructor, U. S. Army, Air Corps Institute, Air Corps Technical School, Scott Field, Ill.

Southern California Section

Alexander, Isaac E., machine and tool designer, North American Aviation, Inc., Inglewood, Calif.

Bostwick, Paul Lee, service and sales, Highland Park Chevrolet Co., Los Angeles.

Brant, Walter R., designer, Adel Precision Products Corp., Los Angeles.

Corey, Eddie de Wood, City of Los Angeles, Bureau of Maintenance & Engineering, Los Angeles.

Dunholter, Howard Frank, engineer, Vultee Aircraft, Inc., Vultee Field, Calif.

Filbry, Herman William, material engineer, Consolidated Aircraft Corp., San Diego, Calif.

Frank, Francis B., publisher, *Autonews,* Los Angeles.

Hix, William Jerome, laboratory engineer, Vultee Aircraft, Inc., Vultee Field, Calif.

Hokanson, Evert C., manager, West Coast Branch, aviation department, Whiting Corp., Los Angeles.

Hollowell, Robert M., engineer, Six Wheels, Inc., Los Angeles.

Johnson, Robert Louis, garage superintendent, City of Los Angeles, Department of Water & Power, Los Angeles.

Jones, David B., machinist, Dale Auto Parts, Bakersfield, Calif.

Pommer, Frank J., assembly supervisor, United Aircraft Products, Inc., Los Angeles.

Sanz, Manuel C., research engineer, Vultee Aircraft, Inc., Vultee Field, Calif.

Shepherd, Bruce Daniel, chief tool designer, North American Aviation, Inc., Inglewood, Calif.

Southern New England Section

Bauernschmid, Paul P., chief designer, Chandler-Evans Corp., South Meriden, Conn.

Clingan, William C., district sales manager, SKF Industries, Inc., Hartford, Conn.

Dektor, Joseph, assistant engine tester, Pratt & Whitney Aircraft, division of United Aircraft Corp., East Hartford, Conn.

Doherty, Gerald Hancock, test engineer, Hamilton Standard Propellers, division of United Aircraft Corp., East Hartford, Conn.

Marks, Joseph David, vice president and chief engineer, The Bolton Mfg. Co., New Haven, Conn.

Pratt, Perry Walter, assistant project engineer, Pratt & Whitney Aircraft, division of United Aircraft Corp., East Hartford, Conn.

Southwest Group

Alexander, James A., assistant equipment superintendent, Constructors of Lone Star Ordnance Plant, Texarkana, Texas.

Scoggin, Baxter I., Jr., manager, research and development, Anderson-Prichard Oil Corp., Oklahoma City, Okla.

Wallace, Roy C., Jr., welder, Spartan Aircraft Co., Tulsa, Okla.

Washington Section

Bisson, Edmond E., assistant mechanical engineer, National Advisory Committee for Aeronautics, Langley Field, Va.

Cooper, Wilbur Stanley, principal mechanical engineer, War Department, Office of the Quartermaster General, Washington D. C.

Hajewski, Cyril M., automotive engineer, U. S. Army, Ordnance Department, Washington, D. C.,

Pettit, John S., district manager, Thompson Products, Inc., Cleveland, Ohio. Mail: 1804 W. Broad St., Richmond, Va.

Vegren, Conrad R., associate engineer, U. S. Army, Ordnance Department, Tank & Combat Division, Washington, D. C.

Outside of Section Territory

Chalkley, William J., Lt., U. S. Army, Division Headquarters, Second Armoured Division, Fort Benning, Ga.

Davis, Harry Francis, field engineer, Cords Piston Ring Co. of Canada, Ltd., Victoria, B. C., Canada.

Kidneigh, E. L., engine house foreman, Florida East Coast Railroad Co., St. Augustine, Fla.

Micka, Frank, Jr., project engineer, Pan American Airways, Inc., Miami, Fla.

Morris, Harold H., lubrication engineer, United Petroleum Corp., Omaha, Nebr. Mail: 1010 Sheridan Blvd., Denver, Colo.

Plovick, Frank P., special representative, United Motors Service, Inc., Detroit, Mich. Mail: 2289 Jackson Ave., Memphis, Tenn.

Foreign

Ellis, Ernest George, junior draftsman, Commonwealth Aircraft Corp., Port Melbourne, Victoria, Australia.

McClean, Herbert G., manager, traction department, Crompton Parkinson Ltd., Chelmsford, England.

Manhart. Charles D. (M) sales manager, carburetor section, Bendix Products Division, Bendix Aviation Corp., Bendix Dr., South Bend, Ind. (mail) 407 N. Sunnyside Ave.

McQuiston, W. H. (J) experimental engineer, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.

Moore, Richard (M) assistant aircraft engineer, Sinclair Refining Co., East Chicago, Ind. (mail) P. O. Box 386, Highland, Ind.

Morey, Albert A. (A) assistant vice-president, Marsh & McLennan, Inc., 164 W. Jackson Blvd., Chicago.

Thomas, T. H. (M) acting chief engineer, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind.

Weber, Clinton L. (J) project engineer, Stromberg injection carburetor, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind. (mail) 1901 Lincolnway, W.

Webster, Frank H. (M) sales engineer, Hyatt Bearings Division, General Motors Corp., 332 S. Michigan Ave., Chicago (mail) 6846 Jeffery Ave.

Williams, Howard Johnson (J) research engineer, Bendix Products Division, Bendix Aviation Corp., South Bend, Ind. (mail) 1355 N. Olive.

Wiseman, R. Bruce (J) junior designer, Buda Co., Harvey, Ill. (mail) 15431 Ashland Ave.

Cleveland Section

Guth, Elmer P. (J) engineer, Waco Aircraft Co., Peters Ave., Troy, Ohio (mail) 128 S. Cherry St.

Hartz, John J. (M) engineer, Goodyear Tire & Rubber Co., Akron, Ohio (mail) 4550 Lahm Dr., R. D. 4.

Nason, Alfred G. (A) original equipment salesman, Thompson Products, Inc., 2196 Clarkwood Rd., Cleveland.

Dayton Section

Mann, Neil W. (J) engineer, Standard Aircraft Products, Inc., Dayton (mail) 329 Shaw Ave., Apt. 4.

McCauley, Ernest G. (M) president, McCauley Steel Propeller Co., 1840 Howell Ave., Dayton.

Stuart, Joseph, III (J) technical research engineer, Aeroproducts Division, General Motors Corp., Dayton (mail) Y.M.C.A.

Detroit Section

Brandau, Marvin William (A) general manager, Aeroquip Corp., Jackson, Mich.

Casenhiser, Edwin O. (M) inspection supervisor, installation and final assembly, aircraft division, Murray Corp. of America, Detroit (mail) 18965 Robson Ave.

Chambers, Allan C. (A) sales manager, brake and B. K. division, Bendix Products Division, Bendix Aviation Corp., 8-204 General Motors Bldg., Detroit.

Champion, James E. (J) inspector, aircraft engines, U. S. Army, Air Forces, Materiel Division, Central Procurement District, 8505 W. Warren Ave., Detroit (mail) Buick Motor Division, General Motors Corp., c/o Air Forces Inspector, Melrose Park, Ill.

Chesebrough, Harry Elmer (M) experimental engineer, Chrysler Corp., 12800 Oakland Ave., Highland Park, Mich.

Cowin, Fred H. (J) laboratory technician, Cadillac Motor Car Division, General Motors Corp., Clark St., Detroit (mail) 39 Louise St.

Dietz, Fred A. (M) assistant chief test engineer, Packard Motor Car Co., Detroit (mail) 16151 Greenview Rd.

Fishtahler, Vernon F. (J) testing engineer, Cadillac Motor Car Division, General Motors Corp., Detroit (mail) 18411 Strathmoor Ave.

NEW MEMBERS Qualified

These applicants who have qualified for admission to the Society have been welcomed into membership between March 15, 1942, and April 15, 1942.

The various grades of membership are indicated by: (M) Member; (A) Associate Member; (J) Junior; (Aff.) Affiliate Member; (SM) Service Member; (FM) Foreign Member.

Baltimore Section

Altseimer, John H. (J) stress analyst, Glenn L. Martin Co., Baltimore (mail) 746 Anneslie Rd.

Wasem, James E., Jr. (J) junior engineer, Ordnance Dept., Automotive Engineering & Design, Aberdeen Proving Ground, Md. (mail) Box 42, Aberdeen, Md.

Buffalo Section

Koegler, Richard K. (J) project structural engineer, Airplane Division, Curtiss-Wright Corp., Plant No. 2, Buffalo (mail) 113 Hodge Ave.

Secord, Charles Robert (J) production design draftsman, Airplane Division, Curtiss-Wright Corp., Buffalo (mail) 390 Millicent Ave.

Welty, John W. (M) chief metallurgist, Bell Aircraft Corp., 2050 Elmwood Ave., Buffalo (mail) 232 W. Hazeltine Ave., Kenmore, N. Y.

Canadian Section

Kilmer, Norman E. (A) secretary, general manager, Weatherhead Co. of Canada, Ltd., 107-9 Inkerman St., St. Thomas, Ont.

Paquette, Norman O. (M) technical assistant to director of production, Department of Munitions & Supply, Automotive Branch, Canadian Government, Ottawa, Ont. (mail) 329 Somerset St., E.

Chicago Section

Droegemueller, Edwin A. (J) research engineer, Standard Oil Co. (Ind.), Engine Lab., Whiting, Ind.

Exter, Robert J. (M) assistant to works manager, Wyman Gordon Co., Harvey, Ill.

Ferguson, Donald B. (A) special representative, Studebaker Sales Corp. of America, 2555 S. Michigan Ave., Chicago.

Kaye, Albert L. (M) manager, alloy bureau, Carnegie-Illinois Steel Corp., Room 1681, 208 S. LaSalle St., Chicago.

Haynes, **Alex L.** (M) engineer, Airplane Division, Curtiss-Wright Corp., Buffalo, N. Y. (mail) 2843 Parker, Dearborn, Mich.

Hillcoat, **Alex** (M) resident engineer, Chevrolet Gear & Axle Division, General Motors Corp., 1840 Holbrook St., Detroit (mail) 14224 Greenview Rd.

Hulswit, **William H., Jr.** (M) physicist, tire development division, U. S. Rubber Co., 6600 E. Jefferson Ave., Detroit.

Karpus, **John Thomas, Jr.** (J) junior engineer, Holley Carburetor Co., Detroit (mail) 32270 Five Mile Rd., Plymouth, Mich.

Little, **David Jennings** (M) 2305 Park Ave., Detroit.

Maxwell, **John F.** (M) eastern district representative, Roadmaster Products Co., Los Angeles (mail) 15894 Ashton Rd., Detroit.

Miller, **Stuart P.** (J) sales engineer, E. I. du Pont de Nemours & Co., Inc., Plastics Dept., 626 Schuyler Ave., Arlington, N. J. (mail) 5-238 General Motors Bldg., Detroit.

Nyman, **Lloyd C.** (A) sales representative, Cole-Hersee Co., 54 Old Colony Ave., Boston (mail) 706-2 Boulevard Bldg., Detroit.

Orloff, **Conrad F.** (J) metallurgical engineer, Chevrolet Motor Division, General Motors Corp., Detroit (mail) 15784 Greenlawn.

Peden, **Douglas Tillotson** (M) chief research engineer, Micromatic Hone Corp., 1345 Milwaukee Ave., E. Detroit.

Pilger, **Adolphus C., Jr.,** (M) lubrication engineer, Tide Water Associated Oil Co., 6400 Richardson Ave., Detroit.

Rippingille, **Frank** (M) Research Laboratories Division, General Motors Corp., Mechanical Engineering Dept. 7, Detroit.

Stamy, **David R.** (M) director, engineering and research, Standard Products Co., 505 Boulevard Bldg., Detroit.

Weldy, **R. K.,** (J) head, engineering department, diesel division, Ex-Cell-O Corp., 1200 Oakman Blvd., Detroit (mail) 5092 Ivanhoe.

Wellington, **Roger D.** (M) project engineer, Detroit Diesel Engine Division, General Motors Corp., 13400 Outer Dr., Detroit (mail) 14528 Ashton Rd.

Wyatt, **Raymond A.** (M) design engineer, Briggs Mfg. Co., Mack Ave., Detroit (mail) 17220 Hartwell.

Indiana Section

Coers, **Frank L.** (J) test engineer, Cummins Engine Co., Columbus, Ind. (mail) 2231 Newton St.

DuBois, **Rene G.** (J) junior test engineer, Allison Division, General Motors Corp., Speedway, Indianapolis (mail) 7080 N. Pennsylvania St.

McCoy, **Joseph E.** (M) chief draftsman, Cummins Engine Co., Wilson at Fifth St., Columbus, Ind.

Parker, **James T.** (A) metallurgist, Pierce Governor Co., Ohio Ave., Anderson, Ind. (mail) R. R. No. 2, Pendleton, Ind.

Metropolitan Section

Black, **William C.** (M) engineer, Adam Black & Sons, Inc., Jersey City, N. J. (mail) 113 Henry St., Hasbrouck Heights, N. J.

Damato, **Dominick A.** (A) shop foreman, Damato's Automotive & Ignition Service, 72nd St. & Hammells Blvd., Arverne, N. Y. (mail) 428 Beach 65th St.

English, **William Paul** (J) engineering records supervisor, Ranger Aircraft Engines, Division of Fairchild Engine & Airplane Corp., Farmingdale, L. I., N. Y. (mail) 150 Secatogue Ave., Apt. 10-D.

Epps, **Max** (M) fuel & lubricant engineer, Ranger Aircraft Engines, Division of Fairchild Engine & Airplane Corp., Farmingdale, L. I., N. Y. (mail) 60 Garden Apt.

Goodwin, **Ralph T.** (M) manager, aviation department, Shell Oil Co., Inc., 50 W. 50th St., New York City.

Hegner, **Alfred** (J) experimental planning, Ranger Aircraft Engines, Division of Fairchild Engine & Airplane Corp., Farmingdale, L. I., N. Y. (mail) Maple Ave., Smithtown Branch, L. I., N. Y.

Hoffmann, **Karl** (J) checker, Ranger Aircraft Engines, Division of Fairchild Engine & Airplane Corp., Farmingdale, L. I., N. Y.

Jamieson, **George R.** (J) junior engineer, Wright Aeronautical Corp., Division of Curtiss-Wright Corp., Paterson, N. J. (mail) 816 Valley Rd., Upper Montclair, N. J.

Kemp, **L. C., Jr.** (M) director of research (refining division), Texas Co., 135 E. 42nd St., New York City.

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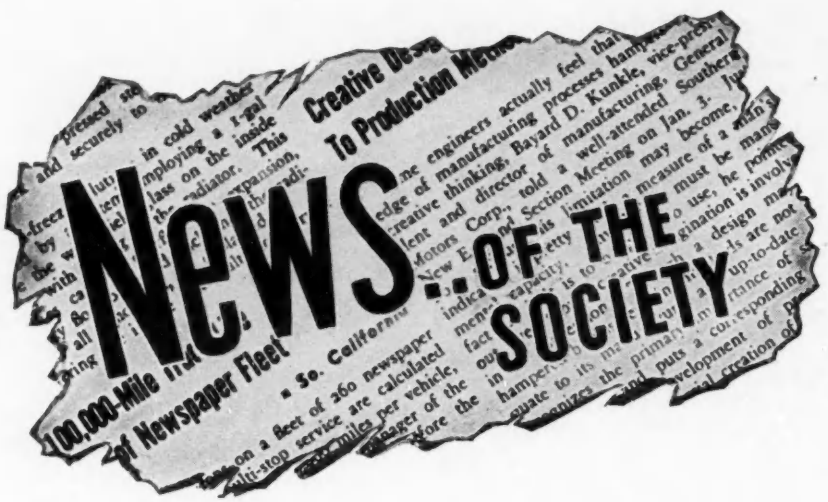


Society, Ordnance, and Civilian Part in War Discussed Before Large Detroit Meeting Group

■ *Detroit*

SOCIETY war activities to date, progress in ordnance design, and the responsibilities of the engineer and citizen during the war, were the main topics of discussion at the March 23 meeting of the Detroit Section in the 1000-seat auditorium of the new Rackham Educational Memorial Building. Many members of the U. S. armed forces were among the 750 persons in attendance.

A. T. Colwell, past president of the Society, represented B. B. Bachman, vice president and chief engineer of Autocar Co., who was scheduled to talk on "The Society's War Effort". Mr. Colwell summarized activities of the SAE War Activity Council, the SAE Quartermaster Corps Advisory Committee, the SAE War Engineering Board, the SAE Ordnance Advisory Committee, the Society's Standards Committee, the SAE Aeronautics Division standardization program, and other activities which are assisting in the nation's war effort.

Cites Unwarranted Criticism

Warning that in the days ahead many more difficult problems must be solved, Mr. Colwell sounded a warning particularly against radical changes in airplanes and engines, pointing out that our designs today have been proved successful but that "many people think that anything with a foreign name or a foreign brand on it is superior."

"Some Observations on Current Military Problems" were presented by Col. H. W. Alden, director of engineering, Timken-Detroit Axle Co., and chairman of the SAE Ordnance Advisory Committee. He told members of the Detroit Section that unwarranted criticisms, especially by laymen on technical subjects, should not be accepted and passed by. "Make your neighbor 'put up or shut up' on such criticisms," he advised.

He said that the Army Quartermaster Corps has a tremendous transportation problem. With the number of trucks and personnel increased greatly in recent months, maintenance problems have been huge. These are being satisfactorily solved, he said, asserting that "intelligent operation of motor transport is distinctly on the upgrade."

With a series of slides he demonstrated the technical changes and improvements in the latest ordnance weapons.

Assault artillery, similar to types of vehicles developed but disregarded 20 years ago, is now developed to the point where it is an important factor in the armed forces, he declared.

"Progress is gratifying in quantity and quality," Col. Alden asserted.

S. L. A. Marshall, military commentator for *The Detroit News*, spoke on "The War and Our Responsibilities." Mr. Marshall, himself a former mining engineer, declared "engineers have a terrific responsibility in this war if they are to measure up to it." He explained "engineers are one of the few groups of men who – while we can't say that they of themselves can win the war – can be responsible for losing it." He compared engineers to Admiral Jellicoe, who at Jutland said: "I could lose the war in one afternoon" although by himself he could not win it.

"The engineer has the plasticity of mind which military men would like to attain but which is so difficult under military life," Mr. Marshall said. "Your minds must remain as impressionable as wax and as keen as the finest steel. You may freeze design – yes, must some time freeze it to get our forces ready – but you must never freeze your ideas," he warned.

"Never say 'this is Perfection itself' because it can never be said in America that anything has reached perfection until the last shell is fired with our arms firing it, and the last dog is hung from the last hill in the city of Berlin.

Sees Long War

"It is going to be a long war," he continued. "That is all the more reason why engineers must not rest content on what they have done.

"The problem is not entirely in your hands. Those for whom you work and those responsible for the funds to do the work must have just as broad and plastic a view as the engineers."

Mr. Marshall quoted the frequent phrases that this is an "engineering war" and an "engineering economy" and interpreted this as meaning "in essence, producing the greatest number at the lowest cost and with the least waste of material.

"In such a program," he declared, "brains are the least expensive and the most indispensable; research must not be stinted."

He disagreed with the apparent satisfaction of the previous two speakers in regard to military design and war production and declared that "you can't win the war in cold blood; you can't win with gadgets, with armor or with fine weapons. If the war goes on and on and on, we know, beyond peradventure of a doubt, that not one weapon or one gadget will be good enough. This is a war of change. We have just begun to see those developments that will prevail."

He declared that our people must be a convinced people and return again to the faith of our founding fathers that this country is worth fighting for. Napoleon, he said, declared that "morale in war is as three-to-one compared with material." He asserted that satisfaction with our designs and production was not as important as having good national morale. On this topic he quoted a letter received that day from a friend, a high British officer, saying "Wishful thinking has done more harm than all propaganda put together."

Attacking the theory that the American people need more leadership and must wait for their leaders to point out their duty and the job to be done, he said:

Scope of Temperature Control Study by T&M Announced

E. P. GOHN, vice chairman of Committee D, "Equipment and Design Factors," SAE T&M Activity program, and Henry L. Brownback, chairman of Subcommittee D-3, "Engine Temperature Control," have announced the outline and scope of a study on controlling engine temperature. The preliminary survey will be made of fleet operators by questionnaires. It is probable that personal interviews will also be made to develop the required information.

Fleet operators will be asked to answer these questions, among others:

1. What means of temperature control do you use on trucks, buses, and passenger cars?

2. What are the shortcomings of present methods?

3. What can fleet operators do to improve temperature control on vehicles?

Such as:

Bypass thermostats; radiator shutters – either automatic or manual-operated; radiator covers; louver covers; controllable pitch fans; oil coolers, etc.

4. Have you had experience in slow warm-up? What is its effect on fuel and oil consumption? What is its effect on mechanical failures?

5. Have you data showing the effects of continuous cold running, or overheating?

6. What has been your experience on oil pan jackets, reduction of fan blades and pulley sizes?

The study, when completed and approved by the SAE T&M Coordinating Committee, of which W. J. Cumming is chairman, will be made available to all SAE members and Government agencies.

"Since when has democracy needed leadership to tell it to defend itself?"

Those who say we need more leadership or more directions ask for totalitarianism and ask for the entrance of the Man on Horseback, he said.

"Don't believe it," he said of these preachings, "Winning is not through tanks and weapons alone but through a recovery in men's hearts of the sense of the greatness of 'government of the people, by the people, and for the people,' and a determination to make it work."

Compares World War I and II

He pointed out the vast differences between this war and the last one. We are wrong, he said, to think that because the foe did not invade the United States in 1918, it is impossible for him to come this way again. It is an American fashion today to say of the war "we did it before, we can do it again."

Mr. Marshall repeated this phrase and said:

"In the last war, until the Armistice, we had no American-made field guns, only one or two squads of observation planes, no fighters or bombers, not a single American tank, and no American shells in the field. Then at the last minute, a colonel loaded 20 shells from America in a tin lizzie and drove hell-bent-for-election to the front so one American shell could be fired before the war was over. He arrived 20 minutes too late.

"Yes – 'we did it before, we can do it again!' " Mr. Marshall declared.

Mr. Marshall summarized our present position by saying "We have one little finger in a pool into which we will have to plunge bodily."

He concluded with a plea for patriotism and for the organization of American manpower and woman-power like that which saved the Red Army. Lack of organization of the civil population defeated the French armies in 72 hours after the invasion started because civilians flooded the highways and clogged the lanes of France, he said.

The meeting concluded with the showing of a sound motion picture taken at the Russian battlefront, called "Russia At War."

"Progress of Aviation" Draws Near-Record Crowd

■ Buffalo

"PROGRESS of Aviation – Old and New" was the stimulating subject of the joint ASME-SAE Buffalo Section meeting, March 11, which attracted a near-record attendance of 400 members and guests. The meeting was held in the Trap and Field Club.

Interesting experiences with early kites, gliders and "crates" were recalled by Max Stupar, one of the pioneer experimenters and designers of aircraft, and now coordinator of manufacturing, Bell Aircraft Corp. In 1905, Mr. Stupar said he built a kite 6 x 3 ft for the purpose of measuring lifting power. His first airplane power was a motorcycle engine which he purchased from the Glenn Curtiss Bicycle Works. Many of his gliders had wings modeled after those of birds, he said, the shapes of which were plotted by imbedding the bird wings in paraffinic wax and then cutting them in numerous cross sections. Later, Mr. Stupar organized the Stupar Air Works in Chicago, to make airplane parts, particularly for Santos Dumont planes. He related how he contracted parts for a gas balloon for a Mr. Fry, and the two men made a successful flight, neither one knowing, before going up, that the other had never made an ascension.

Stages of Progress

Fredric E. Flader, chief engineer, Curtiss-Wright Corp., Airplane Division, covered the various stages in airplane development in his talk "Aerodynamic Problems in Modern Aircraft." He defined the period from 1900 to 1938 as that of the *inventor;* 1939 to 1942 as that of the *production man;* and declared that the future largely belongs to the *salesman.*

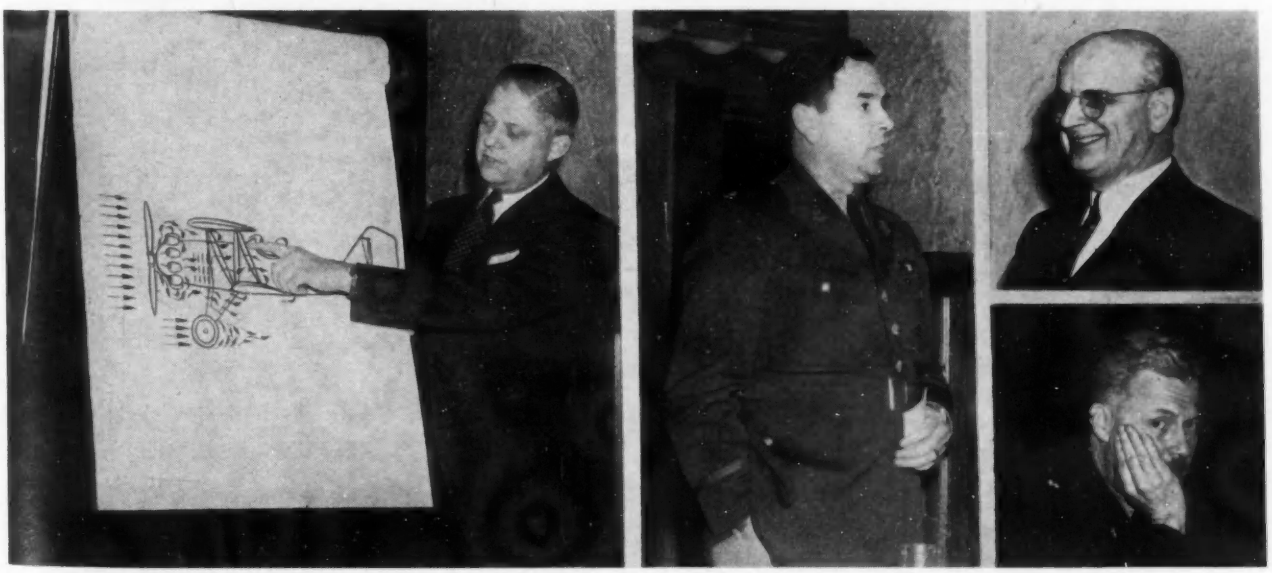
Since his entry into the aircraft field in 1911, when he experimented with gliders in a "wood-shed" shop in Los Angeles, Mr. Flader said the big problem has been to reduce parasite drag – "the built-in head wind with which all early planes were equipped."

Major Willis A. Garvey, in charge of the U. S. Army property office at Curtiss-Wright Corp., spoke briefly on the need for conservation of materials. He indicated that a complete change of attitude toward conservation is needed if America is to carry through the critical period ahead.

The organization set-up of the U. S. Army Air Corps and the various commands of which it is comprised, was detailed by Major Clyde H. Mitchell, resident representative of the U. S. Army Air Corps at Buffalo. He also outlined the base services and told briefly of the laboratory facilities which are in use.

Charles E. Hathorn, patent engineer, Curtiss-Wright Corp., Airplane Division, and chairman of the Buffalo Section, presided. The speakers were introduced by G. M. Magrum, assistant chief engineer, Houde Engineering Corp.

SAE—ASME Joint Meeting Speechmakers



AN AIRCRAFT PROGRESS ROUND-UP was featured at the March Buffalo Section Meeting. (Left) Fredric E. Flader, chief engineer, Curtiss-Wright Corp., Airplane Division, easel-illustrates his discussion of modern aerodynamic problems. (Center) Major Clyde H. Mitchell, resident representative, U. S. Army Air Corps, outlines the Air Corps organization. (Top right) Max Stupar, coordinator of manufacturing, Bell Aircraft Corp. covers the struggles of early aircraft pioneering. (Bottom right) Major Willis A. Garvey, in charge of Army property office at Curtiss-Wright Corp., in pensive mood, before speaking on material conservation

Curtiss-Wright Corp. and Bell Aircraft Corp. photos

Mechanized Warfare Seen an Art by Colwell

■ *Washington*

THE science or principles of war have not changed – but the art or application of these principles has been revolutionized by the internal-combustion engine through mechanization of land forces and the introduction of air power, A. T. Colwell, vice president, Thompson Products, Inc., and past president of the SAE, told 250 engineers at a joint meeting of the SAE Washington Section and the Virginia Peninsula Engineers Club, held at Hampton, Va., March 19.

H. J. E. Reid, Washington Section vice-chairman for the Norfolk area, introduced Mr. Colwell. Mr. Reid is engineer in charge of the National Advisory Committee for Aeronautics laboratory at Langley Field, Va.

The Germans, Mr. Colwell explained, have adopted the modern devices of various nations and coordinated them into armored attack. This type of attack was first conceived by our own Army, but was carried to reality by the Germans.

Pattern For Conquest

Clearly and explicitly Mr. Colwell described the German offensives in Poland, France, and Greece, touching also on the Russian campaign. Careful study of the methods employed by each side, he said, have led our military experts to the following definite conclusions:

1. That World War I was based on *defensive* superiority, whereas this one is based upon *offensive* superiority.
2. That armored forces of the *combined arms* are the most powerful means of offensive action.
3. Given a suitable terrain for operations, the most effective defense against such operations lies in *more numerous and more powerfully organized armored forces.*
4. Armored units must be organized into large formations (corps and army) to give tactical and strategical unity to their operations.
5. There is a definite trend toward more complex combination of heavy caliber arms and equipment.
6. These units must be led by specially and thoroughly trained personnel.
7. Replacement drivers and equipment, and maintenance, are important.
8. Air control is vital.

In connection with the last item, Mr. Colwell reminded his audience that production of aircraft at the rate of 30,000 per year is necessary to keep 10,000 planes in the air.

Mr. Colwell also placed emphasis on the importance of having supplies at the right place at the right time, calling the Germans masters in this phase of warfare.

Our Armored Force Set-Up

Based on the above deductions, he said, our armored divisions are at present visioned as being composed of 12,500 officers and men, equipped with 19,000 weapons, 1140 combat vehicles, 2130 motorcycles, and similar units. It is made up of a command echelon; a reconnaissance echelon of a reconnaissance battalion and an observation squadron; a striking echelon with an armored brigade having two regiments of light tanks and one regiment each of medium tanks and field artillery; a support echelon of an infantry regiment, a field artillery battalion and an engineer battalion; a service echelon composed of an ordnance battalion, a quartermaster battalion and a medical battalion; with combat aviation attached. In addition, there are group headquarters tank battalions to be added to units needing them for striking power.

The composition of the tank destroyer battalion is not definitely established as yet, Mr. Colwell stated. He noted, however, that our Army has conceived it as a highly mobile, hard-hitting offensive unit. All guns, he said, will be on mobile mounts, including half-tracs, jeeps, and swamp buggies. They will move faster than tanks, can be shifted to critical points swiftly, and go into action without waiting to emplace the guns. They can change position quickly, and will be used to delay, disrupt, and confuse the tank attack. They should be particularly effective in pursuit, Mr. Colwell said. Each battalion will have a reconnaissance battery of light tanks and jeeps, all radio equipped. The battalion also will have anti-aircraft guns. Mr. Colwell reported that a large number of such battalions are planned, the principal arms being 37-mm and 75-mm anti-tank guns.

Massing Superior Power

Stopping the armored attack, as any other attack, Mr. Colwell declared, entails *massing superior combat power at a critical point at a critical time.* The automotive engineer, he continued, has given our armed forces speed and dependability on the ground and in the air. Our newly designed tanks and planes are superior to anything of which we know at the present time, Mr. Colwell declared. The best defense against a tank is a better tank – and the only real offense is the air-tank combat team, he said.

Morale of troops and confidence in their equipment are vital, Mr. Colwell said in conclusion. "Equipment superior in quality and quantity with men trained in its use, will dispel the apparition of the invincible 'blitzkrieg.' There is not now and never has been any type of military attack which could not be stopped, once it is understood. The new concept of mobility, surprise, and mass armored power with air artillery has rolled successfully over unprepared and therefore weak adversaries.

" 'When *strength* meets *strength* it will be stopped.' "

After Our Dec. 7th Callers Left

Our present situation in respect to important materials was revealed by Mr. Colwell in his talk before the joint meeting of the SAE Washington Section and the Virginia Peninsula Engineers Club, March 19. In comparing the materials which we had access to, prior to Pearl Harbor, and those which are available to us now, in percentage of world production, he reported the following:

	Available Before Pearl Harbor	Available Now
Magnesium	**87%**	**6%**
Tungsten	**88**	**21**
Chrome Ore	**92**	**6**
Tin Ore	**90**	**17**
Copper	**91**	**68**
Lead	**76**	**54**
Rubber	**92**	**2**
Copra	**98**	**0**

100-Octane Fuel for Cars Not Likely, Clayden Says

■ *Philadelphia*

AUTOMOBILE engine performance will be increased by supercharging, using fuels ot only slightly higher than today's octane numbers, rather than by the use of higher compression ratios and 100-octane gasoline, A. Ludlow Clayden, Sun Oil Co., predicted at the April meeting of the Philadelphia Section.

100-octane gasoline is more suitable for aviation engines than it is for automobile engines, Mr. Clayden said, because aviation engines run hotter and at full loads, which avoids the corrosive products of condensation that would damage automobile engines. At present, there is no 100-octane gasoline without lead, Mr. Clayden stated, adding that the base stock is 85 to 90, above which the improvement is due to lead.

Mr. Clayden outlined gasoline progress since he had last spoken before the Philadelphia Section some ten years ago.

Questions and discussions by Messrs. Billings, Sabina, Scaife, Gohn, Moxey, and Van Hartesveldt, presented more information and drew comments from Mr. Clayden. He agreed that a 90-octane base gasoline plus lead could be used if an antidote is developed to control troubles due to the lead and bromine in ethyl fuel. Other compounds such as iron may be used commercially after the expiration of the Midgley patents, Mr. Clayden said. Performance could be further improved if manifolds could be designed to give perfect mixture distribution to all cylinders at all speeds and load conditions, he suggested. Fuel injection would help here, if the injection system could be made cheaper and if it could handle the minute quantities of fuel required for idling, Mr. Clayden concluded.

Intercooler Paper Gives New Calculation Method

■ *Southern California*

A SIMPLE and rapid method of determining the performance of cross flow intercoolers, oil coolers, or Prestone radiators from laboratory tests of a model or basic unit of the cooler, was given by Paul A. Scherer, AiResearch Mfg. Co. engineer, in a talk at the Southern California Section Aircraft Accessories Meeting, March 13.

Due to the comparative rapidity with which calculations can be made, with this method, Mr. Scherer said it becomes an easy matter to make a series of calculations to

determine the relations between lengths, cooling air flow, and pressure drops for any desired performance.

Reviewing sixteen steps which make up the method of calculation, Mr. Scherer emphasized the special need for such a system as increasingly severe conditions of aircraft operation have made it difficult for power-plant engineers to estimate the size and weight of intercoolers, oil coolers, and Prestone radiators for required performance.

A symposium of brief, prepared talks by the chief hydraulics men from several of the local plants were given following Mr. Scherer's talk; a ten-minute maximum being allowed for discussion after each.

Reducing Strategic Alloy Steel Elements Vital Topic of Milwaukee Section Meeting

■ *Milwaukee*

CONSERVATION of strategic alloying elements in steel along with possible alternate emergency steels were discussed by John Mitchell, metallurgical engineer, Alloy Steel Products, Carnegie-Illinois Steel Corp., before approximately 250 engineers at the March 6 Milwaukee Section meeting, held at the Milwaukee Athletic Club. The steel consumer's viewpoint was given by R. W. Roush, metallurgist, The Timken-Detroit Axle Co. of Detroit.

NE Steel Types

Mr. Mitchell, who is serving as chairman of the joint Technical Committee of the American Iron and Steel Institute and the Society of Automotive Engineers – a committee which has prepared a list of alternate steels to replace the nickel, chromium, and chromium-nickel grades – indicated that as things are now set up, there are basically two types of alternate steels in the NE 8000 series. The first group consists of nine manganese-molybdenum combinations, listed as NE 8024 to NE 8547 steels, while the second group utilizes restricted amounts of chrome and nickel. These are the NE 8620 to NE 8994 steels, Mr. Mitchell said. Supplementing these, which may be used whenever possible, are the SAE 4000 or AISI 4000 carbon-molybdenum steels. Mr. Mitchell is also chairman of the Technical Advisory Committee on Carbon and Alloy Steel Bars, Billets, and Blooms, under the administrative committee of the Steel Branch of WPB.

Alloy Combinations

Almost any of the ordinary alloying elements, said Mr. Mitchell, are most effective when they exist as a combination in small quantities. By using small quantities, the effect is not the sum of the total; it is a product of each, he continued. This point was very carefully considered when the National Emergency steels were established, Mr. Mitchell declared.

The engineers were given a detailed account of the effect of small quantities of alloying elements, through the use of slides. Mr. Mitchell called particular attention to the fact that hardenability was used as the principal criterion in setting-up the NE steels. The end-quench, or Jominy method, was used for determining hardenability. Mr. Mitchell stressed the point, however, that hardenability is not the only factor that must be considered in selecting a steel for any particular purpose, and emphasized the need for expert metallurgical advice in selecting the right combination of elements to achieve the desired physical properties in the steel to be used.

A portion of Mr. Mitchell's talk, in which he briefly described a steel-chemistry slide rule, aroused considerable interest. This unit, which tells what each element will do, by .01% increments, was prepared on the basis of plant experience, and enables melters and metallurgists to apply a heat of steel properly or predict the properties of any given heat on the melting floor.

To give some idea of the growth in use of alloy steels, Mr. Mitchell said alloy steel production has increased approximately twelve times since 1915, while total steel production has approximately doubled in tonnage.

In closing his talk, Mr. Mitchell outlined the work being done by the iron and steel committees operating under WPB and commented upon the hearty cooperation which the various committees and subcommittees are receiving from both steel users and steel producers.

Appreciable saving of the strategic steel alloying elements can be made by using Timken Axaloy steel for making a large number of axle parts, R. W. Roush said in discussing the experience of his company in reducing amounts of precious alloys in steel composition.

Alloy Savings

About ½ lb of vanadium is used per ton in Axaloy gear steels, Mr. Roush said. In Axaloy substitutions for 4620, a possible saving of 40 lb of nickel per ton is made; for 4820, a possible saving of 70 lb per ton; for 4340, a possible saving of 40 lb of nickel and 16 lb of chromium; and for 3240, a possible saving of 40 lb of nickel and 20 lb of chromium is made, Mr. Roush stated.

Composition of Axaloy 140 used in making axle shafts, Mr. Roush described as:

Carbon	.38 – .45%
Manganese	.60 – .80%
Phosphorus	.04 Max.
Sulfur	.05 Max.
Silicon	.15 – .30%

The heat treatment of these shafts is as follows:

Heat to 1550 F continuous conveyor
Cool flange in air blast for 15 sec
Quench in water in rolling fixture
Remove from quench at about 200 F
Temper at 400 F for 1 to 1½ hr
Hardness 500 to 600 Brinell

Stating that this Axaloy, or grainal series, has been tested for several years in laboratory and later on the road, and has proven particularly successful, Mr. Roush said manufacturers of military equipment eagerly await early official recognition and prompt action in making these new and better steels available.

Plastic Die Smoothness Stressed by Frommelt

■ *Buffalo*

THE importance of smooth surfaces in dies and in molds for making plastics was stressed by H. A. Frommelt, director of industrial research, Kearney & Trecker Corp., Milwaukee, in his talk on "Plastics Now an Engineering Material," before the Buffalo Section, Feb. 11. The die must be smooth enough to produce the desired final surface, Mr. Frommelt said. Resins tend to seal over the surface of any fillers which have been used, and if the part is machined, scratched, or even burnished, some of the valuable properties of the resin may be lost, such as dielectric strength or resistance to water.

After a review of plastic history and the part plastics are playing in war engineering, Mr. Frommelt showed an informative set of slides and moving pictures on the use of the Kearney & Trecker rotary head die milling machine. This unit is built so the head can rotate and swing, in addition to the conventional motions, and is equipped with precision registers. The latter features make it possible to produce many intricate shapes without any preliminary layout on the block.

Emphasizing the inroads plastics are mak-

SAE Student Branches

Oregon State – March 13

"New and Substitute Bearing Materials" was the title of the talk delivered by R. A. Watson, factory manager, Pacific Division, Federal-Mogul Corp. Mr. Watson specified that a bearing must have embeddability, enough strength so it will not be crushed, and lubrication. He emphasized the advantages of new thin-lined bearings, especially Bermax bearings and bearing materials. An hour-long discussion period followed the paper.

Purdue – March 19

Average cost of upkeep for all Indiana roads runs around $480 per mile per year, Prof. B. H. Petty of the Civil Engineering School of Purdue University told members of the SAE Student Branch. U. S. 40 in Indiana cost $100,000 per mile to construct, Prof. Petty said, and some replacements along the same road cost $30,000 per mile.

Super-highways, such as the Pennsylvania Turnpike, are better than are actually needed, Prof. Petty pointed out, since the modern automobile cannot sustain such high speeds for any length of time. However, roads built twenty years ago definitely need to be modernized, he said, to increase the safety factor. Now that automobile weights and sizes have been limited by law, the road engineer has something concrete with which to work in constructing highways, Prof. Petty said.

The speaker gave a brief history of transportation and roads from the invention of the wheel to the present modes of travel.

An hour discussion period followed during which the audience asked leading questions concerning highway construction, lighting, planning, and upkeep.

M.I.T. – March 21

Future of the automobile industry after the war, and use of dynamometer run-in equipment for production of military engines was discussed by Charles A. Chayne, Buick's chief engineer.

ing in engineering construction, Mr. Frommelt said his firm was now using plastic materials to make certain parts of milling machines.

Technicolor Films Draw Keen Interest

▪ Indiana

THREE technicolor sound pictures were shown at the March 19 meeting of the Indiana Section, held in the Antlers Hotel, Indianapolis. They included:

"Unfinished Rainbows" – the romantic story of aluminum – the unwanted child – from early development to its extensive use in many industries. Produced under the direction of the Aluminum Co. of America.

"Steel, Man's Servant" – the story of steel from mine to many types of finished products. Extraordinary views of iron and steel mills, of interest to even veteran technical men. Produced by U. S. Steel Corp.

Bell Aircraft Corp. film of the "Airacobra," with some views of the Allison plant. Vivid action pictures of the plane in flight, and demonstration of its vast fire power.

A larger-than-average attendance showed keen interest in the films. Not originally scheduled, the sound pictures were included on the program at the last minute when SAE President A. W. Herrington and three alternate speakers were forced to cancel their appointments.

42 Aeronautical Material Specifications Cleared

FORTY-TWO new and revised Aeronautical Material Specifications were cleared by the Aircraft Materials and Processes Coordinating Subdivision, Aeronautics Division of SAE Standards Committee, at the combined meeting of its three committees dealing with aircraft engines, airframes, and aircraft accessories, held in Dayton, Ohio, March 25 to 28, inclusive.

In accordance with the decisions reached at this meeting, revised drafts of these specifications are being prepared for submittal to the Aeronautics Division for final approval. It is planned to have these approved specifications ready for distribution on or about May 1.

Other Specifications

In addition, 35 other specifications were discussed and tentative decisions made with the understanding that revised drafts will be prepared and submitted to the subdivision for letter-ballot prior to their submittal to the Aeronautics Division for final approval.

Action on these 42 new and revised specifications follows closely on the heels of the 17 new and 26 revised Aeronautical Material Specifications approved by the Aeronautics Division and issued on March 1 for use throughout industry. The fact that 1200 sets of these new specifications were sold during March is a good indication of their wide acceptance and usage by the industry.

J. B. Johnson, U. S. Army Air Corps, is chairman of the Aircraft Materials and Processes Coordinating Subdivision; B. Clements, Wright Aeronautical Corp.; L. D. Bonham, Lockheed Aircraft Corp.; and Dr. N. E. Woldman, Eclipse Aviation Division, Bendix Aviation Corp., are chairmen of the aircraft engine, airframes, and accessory committees of this Subdivision, respectively.

Gathering Comments

Another vital activity of the Aeronautics Division, under the chairmanship of Arthur Nutt, Wright Aeronautical Corp., is the eight surveys to obtain the coordinated comments of the industry which either have been completed recently, or are being conducted. Two of them, conducted at the request of the Working Committee of the Aeronautical Board, concern: (1) a proposed amendment to the controversial Taper Pipe Thread Specification, AN-GGG-P-363; and (2) proposed standard sizes and alloys for aluminum-alloy tubing. In answer to the Aeronautical Board's plea for emergency action on the latter survey, a summarized report was delivered to this body on April 4, five days after the questionnaires were rushed to units of the industry. In addition, six surveys have been completed or are under way by the Hydraulics Equipment Committee of the Aircraft Accessories and Equipment Subdivision, to obtain the coordinated comments of the industry on proposed standard specifications and envelopes for various items of hydraulic equipment. Harold W. Adams, Douglas Aircraft Co., Inc., is chairman of the Hydraulics Equipment Committee.

Six Aeronautical Standards also were ap-

proved on March 1, along with the 43 new and revised Aeronautical Materials Specifications approved at that time. Since that time six additional Aeronautical Standards have been approved and released by the Aircraft-Engine Subdivision under the chairmanship of Val Cronstedt, Pratt & Whitney Aircraft, Division of United Aircraft Corp. These latest standards include recommended envelope dimensions for carburetors and the comprehensive standard for involute splines currently used by the aircraft industry.

4-Point Drop in Octane Number Seen Having Broad Effects

▪ *New England*
▪ *Baltimore*

ON a nation-wide average, regular-grade gasoline octane rating has been dropped from 75 to 71, George H. Freyermuth, assistant manager, engineering division, sales department, Standard Oil Co. of N. J., told SAE engineers in a talk before the New England Section, March 19, and again before the Baltimore Section, April 2.

Production of 100-octane aviation gasoline not only is eating into our high-octane-number base stocks, Mr. Freyermuth stated, but also into our tetraethyl lead supplies. At present, he said, only about one-half of the tetraethyl lead normally required for civilian purposes is available.

Further Drop Likely

If no additional amounts of lead are available, the speaker predicted further drops in octane number of gasoline. Due to decrease in base octane number, Mr. Freyermuth said it may hit 69 by 1944. To restore octane numbers to the level of 1941 by the end of 1943 would require an increase of some 40% in the amount of lead manufactured for civilian use in 1941, Mr. Freyermuth said. This amount, added to the large military requirement, would probably exceed manufacturing capacity at that time, he said.

There is no reason to believe yet, he advanced, that reduced consumption – through the tire shortage and gasoline rationing – will result in any marked improvement over present levels of the octane number of civilian regular-grade gasolines.

What drivers will do to meet this situation was outlined by Mr. Freyermuth as follows: "Some will switch to the use of premium gasoline, if it continues to be available. Others will simply drive easier by accelerating less rapidly and shifting gears more often; a substantial number will retard the spark, to eliminate knock. Some few cars whose octane requirements are based on preignition cannot be readily corrected by retarding the spark, and must either use premium fuel or undergo major mechanical changes."

Trucks Face Problem

Commercial vehicles face a more serious problem, Mr. Freyermuth declared. Some made within the last two years were designed to run on the then available high-octane fuel. Much older vehicles have been modernized by use of higher compression cylinder heads or pistons to gain economy and performance, he said.

Due to a need to aid war projects, some truck owners may request a special higher octane fuel. However, Mr. Freyermuth said, that would require multiple facilities – tankage, lines, trucks, and barges – which are unobtainable at present.

Advice for Truck Drivers

"Truck operators getting detonation should either accept it with such mechanical difficulties as result; make mechanical changes to reduce or end it on lower octane fuel; or use suitable blends of regular with premium fuel for the most critical equipment, provided the former is available," the speaker advised.

The passenger car and truck motor oil situation, Mr. Freyermuth labeled as not very serious.

Erratu...

It was incorrectly stated in the April 1942 SAE Journal, p. 39, that the facilities of the Horace H. Rackham Educational Memorial Building, 100 Farnsworth Avenue, Detroit, are open for use of Detroit SAE members. SAE members will have no privileges in the building unless they also carry membership in The Engineering Society of Detroit, Inc., though all SAE members will be admitted to the building if they wish to go to the SAE office on the second floor or to attend any regularly scheduled meeting of the Society of Automotive Engineers.

"Rubber Miser" Is Designed to Transport Defense Workers and Save Scarce Materials

A GOVERNMENT-INDUSTRY answer to the dilemma: "How to transport hundreds of thousands of workers to armament plants with the least wear and tear on tires?" is this prototype super trailer-bus.

Designed by SAE Vice President Fred B. Lautzenhiser, technical consultant of the Automotive Branch, WPB, and developed by Frank H. Shepard, special assistant of the Office of Defense Transportation's Division of Local Transport, this oversize passenger trailer uses a minimum of strategic materials and has a gargantuan (140) passenger capacity.

When the bus is parked at either terminus, the standard 1½-ton tractor can be used for hauling freight trailers.

Says ODT: "Assuming an average load of two workers per private automobile, the truck-trailer-bus would carry on 14 tires a passenger load of 70 cars using 280 tires."

Specifications:

45 ft long (including tractor unit, 55 ft).

Conventional type of steel frame.

Two axles, dual wheels.

Minimum of steel in body. Sides and top of masonite and plywood.

Weight: 12,000 lb, as compared with 17,000 lb for standard 40-passenger city bus.

This trailer-bus was built by close cooperation of engineers of the International Harvester Co., Edwards Iron Works, Inc., South Bend; Schult Trailer Co., Elkhart, Ind.; Clark Equipment Co., Buchanan, Mich.; Union City Body Co., Union City, Ind.; Troy Sunshade Co., Troy, Ohio; and Electric Service Supply Co., Philadelphia. Components and labor were donated by these companies for this "pilot" model.

Drawings and specifications, for any builder interested, are available from Mr. Shepard, Office of Defense Transportation, Interstate Commerce Building, Washington, D. C.

Right: 87 fixed seats, 24 drop seats, and 30 standees bring capacity of ODT prototype to 141. Below: Two doors permit unloading in 60 sec. Bus can be built "open model" where weather is mild, reducing cost.

OEM photos by Freeman

Spot Welding Speeds Plane Output, Merriman Says

■ *Detroit*

AIRCRAFT spot welds can be installed 60 times faster than equivalent rivets, Paul Merriman, plant electrical engineer, Glenn L. Martin Co., said in a talk entitled "How to Increase Aircraft Output by Welding," given before a joint meeting of the Detroit Section and the American Welding Society, March 2. He added that if only 10% of an aircraft structure can be welded there are still substantial savings to be had.

Mr. Merriman outlined some of the problems facing the welding processes due to two-fold growth of aircraft plants in recent months; the difficulty of obtaining satisfactory labor and the day and night operation of equipment that has been regarded as complicated and delicate.

Specifying the duties of the welding engineer in a new design, Mr. Merriman said he must advise, or even dictate on occasion, some features of the structure. He must know where to apply welding, and must have authority to enforce his decisions in this respect. Moreover, he must sort out in each new design the likely spots for the application of spot welds. There should be control over such things as: flange widths, spot facings, ranges of gages, and gage combinations, and the number of thicknesses of metal to be spot welded. If these features are given proper consideration in the design stage, the application of welding will be much easier, Mr. Merriman said.

Welding Machine Log Book

As a matter of operating record, Mr. Merriman advised that each welding machine should have a log book, signed and co-signed by the chief operator and the maintenance department to show every stop of more than five minutes in a production day. A trained maintenance crew operating with good records to guide them can detect tubes and solenoids that are about to fail, loose arms on machines and other incipient points of failure, he said. Such preventive maintenance makes it possible to make minor repairs on Sundays, during lunch times or other "down times" to keep them operating full time and also permit the maintenance department to schedule over-hauls so the machines can be kept in operation a maximum part of the working time, Mr. Merriman stated.

"The maintenance angle can make or break a spot-welding program," Mr. Merriman declared. "The welding engineer should select and train personnel for the job and should provide ample supervision. It is wise to select a crew that has no weaklings in it. If the repair crew on the second shift, for instance, cannot repair a breakdown, there may be a sixteen-hour loss before the day crew comes on and repairs the machine. The loss may cost $1000 per hr. Personnel is important."

Encourages New Ideas

Tinkering is permitted in the program which Mr. Merriman supervises. "Men with ideas deserve an opportunity to try them out," he said, adding that this produces creative work which helps to improve equipment, product, safety, or quality.

Research in welding must be continuous, Mr. Merriman said, paying tribute to Detroit as the "area where research in manufacture has its ultimate expression." Investigations must continue on: 1 new types of surface cleaning; 2 new types of electro tips; 3 new types of alloys and contours for tips; 4 cooling of tips; 5 wave forms – and the manner of introducing heat into welds, which is still a virgin field; 6 the sequence of operations and pressures, etc.; 7 fatigue and corrosion, and 8 new types of equipment and new processes of welding, such as butt welding.

Praises Women Workers In Optical Industry

■ *Canadian*

HIGH tribute to the skill of women employees of Research Enterprises, Ltd., Canada's first and largest optical glass manufacturer, was made by the company's president, Col. W. Eric Phillips, guest-of-honor speaker at the March 18 meeting of the Canadian Section held at the Royal York Hotel, Toronto. "In our kind of work they are just about unbeatable," Col. Phillips said. "We intend to increase the proportion of women workers as compared with men as we expand."

The speaker told 142 members and

guests, that Research Enterprises, Ltd., a government war industry, went into production in September, 1940, and is now producing large quantities of optical material for the war effort. Products of the company, which are rated equal to the best turned out in Germany, include: optical glass, high quality lenses, prisms, optical instruments, specialized fire control instruments, tank periscopes, and precision testing devices for other war industries. "Our instrument program has expanded ten times over since Research Enterprises was formed," Col. Phillips said.

The eyes of the fighting forces of the United States as well as the dominions of the English Empire are protected by the products of this newly-developed company, the Colonel stated. The company has the advantages of both a governmental and a commercial industry, he said, having the authority of the former and the business management of the latter.

Col. Phillips' address was illustrated with slides and was followed by motion pictures of operations in Research Enterprises, Ltd. Host of the evening was Exide Batteries of Canada, Ltd. R. W. Richards, Section chairman, presided.

Cites Automotive Technique Used in Plane Production

■ Detroit

APPLICATION of automotive technique to the manufacture of airplane engines has been widespread, Joseph Geschelin, Detroit technical editor of Chilton Co., and vice president of the SAE for the Production Activity, told some 350 engineers at a meeting of the Detroit Section in Toledo, held jointly with the Toledo Sections of the American Society of Mechanical Engineers and the American Society of Tool Engineers, April 6, at the Commodore Perry Hotel.

Types of Machines Used

Examples of such application, Mr. Geschelin said, include: the use of multiple spindle drilling, tapping, and boring machines; precision boring machines; high-cycle tools for assembly operations; cemented carbide tools for non-ferrous metal cutting and for steel cutting; production of fine surface finishes; surface broaching; the use of heavy-duty milling machines and grinders similar to those used in passenger car practice; and applications of advanced methods of gear finishing.

Size of Production Problem

"Some idea of the magnitude of the production problem may be gained from the following basic statistics on the Wright Cyclone 14," Mr. Geschelin said. "The engine is composed of 3500 different parts, totaling 8500 individual pieces; the estimated number of machining operations is placed at 80,000, and the quality control program anticipates some 50,000 inspection operations. To handle this volume of machine-shop activity just on parts to be made in this plant entails the installation of 2400 machine tools of every description, including the most advanced equipment known to the art."

In the manufacture of ordnance material in quantities hitherto unknown, Mr. Geschelin said, "the pressure of volume and the production-wise experience of automotive factory executives have combined to revolutionize the art."

D. G. Roos, vice president and chief engineer, Willys-Overland Motors, Inc., and an SAE past president, appeared on the program to inform members and guests about the current activities of the Society. Robert P. Lewis, chief engineer, Railway & Axle Division, Spicer Mfg. Corp., was chairman of the meeting.

The Commander Sees It Through

High tribute was paid to Lt.-Gen. A. G. L. McNaughton, commander-in-chief of Canada's fighting forces, by Col. W. Eric Phillips in his Canadian Section address, to whose foresight the Colonel attributed the establishment of Canada's pioneer optical equipment industry.

Gen. McNaughton, a Canadian engineer, savant and inventor, as a young man was said to have revolutionized gunfire practice during World War I. He served for some years as the dynamic chief of the National Research Council of Canada. Several years before the war, Gen. McNaughton endeavored to persuade the Canadian government to establish an optical glass industry in Canada. It was largely due to his insistence that Research Enterprises, Ltd., was brought into being.

Contends Diesel Must Have More Than High Thermal Efficiency

▪ Northwest

ALTHOUGH thermal efficiency of the diesel engine is about 35%, 10% higher than that of the gasoline engine, this difference in efficiency alone is not enough to justify the increase in weight or any other disadvantages of the diesel engine, W. A. Linville, chief automotive engineer, General Petroleum Corp. of Calif., told a meeting of the Northwest Section of the Society, held on March 12, Seattle, Wash. Continuing his comparison of these two fundamental types of internal-combustion engine, Mr. Linville brought out that the diesel engine maintains its efficiency during the period of throttling down, while the gasoline engine, during a similar period, tends to lose its efficiency very rapidly. Pointing out first that all the early diesel engines were of high bore and low speed, he emphasized that, when high-speed diesels of smaller bore were developed, a serious problem had to be met since the area which is so vital in dissipating the heat was decreased when the bore was made smaller.

A high-speed diesel, he declared, is just as good as its burning system, pointing out that, with fuel of the wrong cetane number, uncontrolled burning takes place and causes detonation.

Discussing lubricants, he explained that it was found necessary originally to use naphthenic-base oils in Caterpillar diesels because of the varnish condition; but today, through the use of additives, paraffinic-base lubricants can be used successfully.

Three GE Engineers Talk Before Capital Group

▪ SAE Capital District Group

THREE General Electric engineers spoke at the March 12 out-of-town meeting of the SAE Capital District Group of Albany, held at Union College in Schenectady, N. Y. Electric transmission, dynamometers for engine testing, and magnetic testing of steel were the paper topics.

Indicating the broad application of electric transmission today, H. G. Morse, GE sales engineer, said this power method is being used in internal-combustion engines on pleasure cars, trucks, buses, locomotives, and ferries.

Mr. Morse detailed the construction of electric transmission systems and explained how they operate, especially in buses.

Dynamometers Aid Fleet Operators

Describing electric dynamometers as prime movers, load-absorbing machines and dual-purpose units, B. S. Weaver said fleet operators can use dynamometer equipment to advantage in checking vehicle performance, in brake testing, and in tuning-up engines. The trend toward power recovery apparatus at the present time is brought about by the need for conserving power as a war measure, Mr. Weaver said, adding that after the war there will be a further trend in this direction as an absolute economic necessity.

E. A. Stack of GE's works laboratory discussed magnetic testing of steel.

Airplane Propeller and Wheel Balancing Topic at Club Meeting

▪ SAE Club of Colorado

BALANCING of airplane propellers and wheels was discussed by Marcellus Merrill, owner, Merrill Engine Laboratories and Merrill Axle-Wheel Service, at the two-paper March 17 meeting of the SAE Club of Colorado.

Harmonics are encountered at various speeds in propeller balancing tests, Mr. Merrill said, and it is necessary to separate these from the particular vibrations set up by the unbalance the engineers are trying to correct. Often unbalance can be corrected by a small fraction of an ounce of weight on propeller blades, he said, through the use of balancing equipment which employs the stroboscopic method for measuring vibrations.

It was shown that the slightest out-of-balance on wheels sets up vibrations to such an extent that they sometimes throw out of calibration the instruments on the instrument panel. This, too, can be corrected by use of a little weight, Mr. Merrill said.

Also demonstrated was the new method of hypodermic balancing. This new set-up was worked out for the government by Mr. Merrill after it was found that weights on the wheels had a tendency to come off at fast landing speeds. The Gates Rubber Co. has cooperated in developing a compound for Mr. Merrill which consists of ground lead and rubber. The tire is deflated and the compound is injected through the casing at the spot which needs "weighting." Then the tube is inflated, causing the material to adhere to the inside of the casing, thus eliminating the out-of-balance.

Paul Briggs, president, Aviation Institute of Denver, Inc., was also a guest speaker at the meeting. With the aid of several torn-down aircraft engines he described aircraft-engine maintenance methods. Mr. Briggs was formerly superintendent of maintenance, Continental Air Lines.

Voorhies Misquoted in Section Meeting Report

In the report of the Northern California Section meeting of the Society, held on Dec. 9, 1941, at the Hotel Leamington, Oakland, Calif., published on pp. 71 and

Car Blackout Lighting Project of Research Students

▪ Northern California

REDUCING blackout driving hazards with the minimum betrayal of position to the enemy is under project by students of the University of California, according to Professor of Mechanical Engineering L. M. K. Boelter, in addressing the Northern California Section, at the annual student meeting, held March 10, in the Leamington Hotel, Oakland. Through correlating European blackout driving experience and combining it with experimental laboratory data at the University, they hope materially to improve the art, Prof. Boelter said. Also on the University's program, is an emergency NACA request project for research on cabin heaters for aircraft, he declared.

Variety of Courses

Although the mechanical engineering department of the University stresses fundamental fields of hydraulics, acoustics, thermodynamics, mechanics, and strength of materials, Prof. Boelter said specialized courses are offered in steam, pumping, and automotive engineering.

Student research problems which relate to the automotive engineering field, Prof. Boelter listed as:

- Manifold impedance
- Effect of vibration in cooling
- Evaporation in still bodies and fluid jets
- Compressibility
- Diesel self-ignition
- Headlamp and road light distribution tests
- Operator tests for control and vision
- Noise level tests for both new and old cars
- Spectrum of horns and sirens
- Automatic headlamp depressors
- Positioning of tail light and stop light filaments

Student papers, which are usually featured at the annual meetings, were missing because the students have been too busy this year to prepare them, according to Prof. Carl J. Vogt, technical chairman of the Northern California Section. However, papers were provided by faculty members of the College of Engineering. Prof. M. P. O'Brien read his paper "Personnel and Defense Training Problems Related to Engineering," previously presented before the Southern California Section. (Report on page 29. March SAE Journal).

72 of the February, 1942, SAE Journal, Carl Voorhies, Wilcox-Rich Division, Eaton Mfg. Co., was quoted incorrectly. Summarizing Mr. Voorhies' presentation of his paper: "Some Results of Valve-Gear Research as Applied to Diesel Engines," this report erroneously quoted him as saying "that a surface stress of 125,000 psi has been found satisfactory for cast iron on cast iron, while 189,000 psi is the maximum for cast iron on steel."

Correct Statement

Actually, referring to the stress between tappet and cam, Mr. Voorhies' paper states: "Field results indicate that, where flat followers are used, 121,000 psi is the lowest stress where failure occurs, and 125,000 psi is the highest stress operated successfully . . . Field results indicate that a cast-iron tappet with spherical face on steel has a limit of 189,000 psi maximum stress and that there is very little variation in the point of failure."

Fuel Talk Presented Before Milwaukee Engineers

▪ *Milwaukee*

ONE hundred members and guests of the Milwaukee Section heard J. S. Bogen, Universal Oil Products Co., speak on gasoline fuels and octane ratings at the April 3 meeting. Wartime restrictions prevented Mr. Bogen from revealing too specific data relative either to aviation gasolines or possible developments in gasolines for use during or after the war.

Mr. Bogen pointed out the present limitations of the octane numbering scale since fuels have already been developed with higher antiknock values than 100 on the octane scale. Most of his paper dealt with the chemical structure of the carbon-hydrogen fuels.

New Members Qualified

(*Concluded from page 37*)

Chitwood, J. Vern (A) field representative, engineer, Fram Corp., East Providence, R. I. (mail) 1533 N. W. 32nd St., Oklahoma City, Okla.

Helm, Elbert D. (A) compounding plant superintendent, Texas Pacific Coal & Oil Co., Fort Worth National Bank Bldg., Fort Worth, Tex. (mail) Route 6, Box 527.

Kennedy, E. L. (A) engineer, Cato Oil & Grease Co., Oklahoma City, Okla. (mail) 1509 N. E. 13th.

Washington Section

Carlson, Ralph E. (J) draftsman, U. S. Navy Department, Washington (mail) 3194 Westover Dr., S. E.

Posner, David Leo (J) assistant aeronautical engineer, Civil Aeronautics Administration, Washington (mail) c/o Brutzkus, 310 Sixth St., S. E.

Outside of Section Territory

Berry, Frank (A) superintendent, design engineer, W. T. Adams Machine Co., Inc., Corinth, Miss. (mail) 1301 Bunch St.

Blasingame, R. U. (M) head, department of agricultural engineering, Pennsylvania State College, State College, Pa.

Hawkins, Robert B. (J) test engineer, Sealed Power Corp., 500 Sanford St., Muskegon, Mich. (mail) 621 Leahy St., Muskegon Heights, Mich.

Jones, J. Arnold (J) engineer, Kendall Refining Co., Bradford, Pa. (mail) 77 N. Kendall Ave.

Munsell, Judson D., Jr. (A) field engineer, Kendall Refining Co., Kendall Ave., Bradford, Pa.

Poole, John Ward (M) manager, research division, Lion Oil Refining Co., Exchange Bldg., El Dorado, Ark.

Riegel, G. C. (M) chief metallurgist, Caterpillar Tractor Co., Peoria, Ill.

Staley, K. E. (A) zone branch manager, Chevrolet Motor Division, General Motors Corp., 902 Capitol Ave., Omaha, Nebr.

Tracy, Frederick F. (J) junior mechanical engineer, U. S. Army, Air Corps, Materiel Division, Wright Field, Dayton, O. (mail) Northeast Harbor, Me.

Foreign

Bassett, Henry Norman (F M) chief chemist, Buenos Aires Great Southern Railway; Buenos Aires Western Railway, Plaza Constitucion, Talleres del F.C. Oeste, Liniers, F.C.O. Buenos Aires, Argentina.

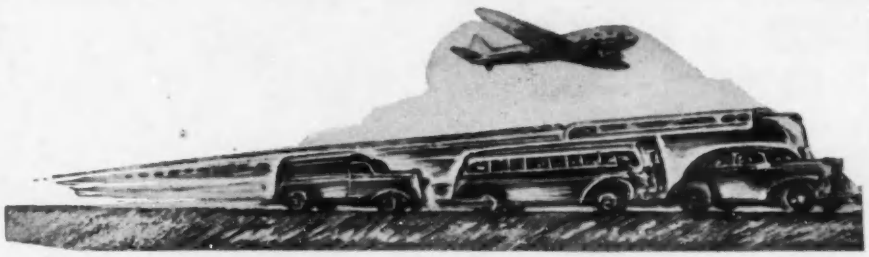
Craig-Williams, Allen (F M) technical manager, Burtonwood Repair Depot, Great Sankey, Warrington, Lancs., England (mail) Yew Tree House.

Delamar, Carl D. (J) assistant chemical engineer, Panama Canal Department Engineer, U.S.A., Service Section, Balboa, Canal Zone (mail) Box 665.

Engineer, Framrox Darashaw (F M) works manager, Bombay Cycle & Motor Agency of Secunderabad, James St., Secunderabad (Deccan) India (mail) 53 Sabastian Rd.

SAE JOURNAL *Pre-Prints*

THE SOCIETY OF AUTOMOTIVE ENGINEERS, INC. 29 W. 39TH ST., NEW YORK



News of the **JULY** *Issue*

AUTOMOTIVE ENGINEERING AT WAR THEME OF BIG JULY SAE JOURNAL

A BOMBSHELL exploded in the SAE Journal editorial office, April 15!

TRANSPORTATION PRIORITIES AND THE CONTINUED PRESENCE OF ENEMY DIPLOMATS AT WHITE SULPHUR SPRINGS CHANGE SUMMER MEETING PLANS.

Immediately SAE executives held a round-table meeting.

Extreme war emergencies made it even more imperative, they decided, that SAE members – production men, engineers, technicians – get the full technical fare of a big national SAE Summer Meeting. As part of a comprehensive plan to do just this, the July SAE Journal was designated as the "1942 Summer Meeting brought to your desk."

The pattern:

Outstanding papers, representing every phase of automotive war engineering, selected by experts from a pool of those which were to have been presented at the Summer Meeting . . . Specially-prepared articles . . . Plus the regular technical contents . . . and a variety of special features.

The editorial department went to work!

(*Concluded on page* 10)

THE JULY SAE JOURNAL will be the SUMMER ~~MEETING~~ WAR ISSUE

Rubber Engine Mountings Cut Military Truck Vibration

WITH military trucks running into all sorts of off-the-road operation in modern war service, it becomes increasingly important that engine vibration be reduced to a minimum, protecting vehicle parts against shock and strain.

Shear-loaded bonded rubber mountings are the most effective means yet devised for cutting down such vibration, Paul C. Roche, field engineer, Lord Mfg. Co., says in the July SAE Journal. The material in Mr. Roche's paper, representing considerable on-the-job experience in this type of work, particularly with commercial-type engines, forms a basis on which an engineer should be able to analyze and lay out his own installation.

Mr. Roche candidly disproves a number of erroneous impressions about rubber engine mountings, pointing out, for example, that it is not necessary to tolerate instability of the powerplant in order to realize a high degree of vibration absorption.

Here are stimulating facts and ideas on a subject important to engineers designing our military vehicles.

How Will War Affect Post-War Car Designs?

DETROIT automobile assembly lines had hardly ceased rolling when engineers began speculating about "what the post-war cars will be like."

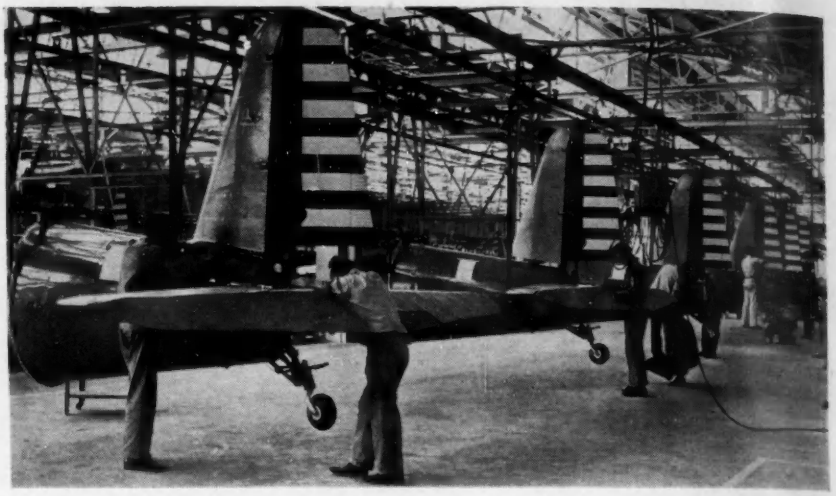
Will bodies be made of steel, of aluminum, or of plastic? . . . Will rear-end engines come with peace? Will engines be smaller? . . . How about automatic transmissions? These and hundreds of other questions have been running rampant through the technical whispering galleries.

Many prophetic answers to these questions will be found in Frank Jardine's exciting July SAE Journal paper "Effect of War Developments on Post-War Car Designs."

Mr. Jardine, chief engineer, castings division, Aluminum Co. of America, believes that, among other reasons, light-weight bodies of aluminum are pretty much in the cards because of the gasoline economy derived therefrom. War experience in processing aluminum will do much to develop the art, he feels, and the nation's productive capacity in aluminum will have been expanded enough at war's end to meet the car-body demand and to lower the price of this material substantially.

If you'd like to match your preconceived notions on post-war car design with an expert, set aside a half hour of your reading time for Frank Jardine in the July SAE Journal.

(News note: $60,000,000 worth of automobile dies may be ordered scrapped by the WPB, including those for 1942 models. Thus 1942 designs may be "buried," clearing the way for basic changes in the post-war era.)



CONVEYORIZED TAIL ASSEMBLY *is typical of operations in the highly mechanized departments in the Vultee plant, recently visited by Joseph Geschelin. The adoption of such mass-production methods, he says, is getting American planes into the air quicker than was previously thought possible (see below)*

Automotive "Know-How" Accelerating War Output

THE mistaken notion that an automobile plant can be utilized without much change to the immediate production of airplane engines, or bombers, or of fighters, has led the layman to criticize the speed with which the conversion program is being executed, says Joseph Geschelin, Detroit technical editor, Chilton Co., in the July SAE Journal.

"The layman has failed to understand that the facilities of an individual plant first must be surveyed to determine exactly what kind of war products can best be produced;" Mr. Geschelin admonishes "that the industry must gear up to produce an endless variety of such products; and that actually only a small percentage of available equipment can be turned to useful purpose on specific tasks for which it is best suited."

Actually the automotive industry is doing a tremendous war job, he declares, and goes on to show the infinite number of ways automotive "know-how" is influencing the whole trend of war production activity.

If you've been wondering what has been going on behind-the-scenes in the huge automotive factories since they went on a war footing, you won't want to miss Joseph Geschelin's absorbing July SAE Journal article – "Conversion for War – Influence of Automotive Mass-Production Methods."

Automotive Engineering at War

(*Concluded from page 9*)

By wire, telephone, letter, the scheduled speakers were contacted – Lt.-Com. J. D. Mooney, chief, Production Engineering Section, Bureau of Aeronautics, U. S. Navy; Joseph B. Eastman, director of the Office of Defense Transportation; Frank Jardine, Aluminum Co. of America; Paul C. Roche, Lord Mfg. Co.; E. N. Klemgard, Naval Engineering Experiment Station; George Round, Socony-Vacuum Oil Co., Inc.; John L. Ryde, McCulloch Engrg. Co. . . . and others.

Slowly the pattern began to take shape. Papers crossed the editor's desk on aircraft production expediting, conservation of motor transportation, Army motor transport maintenance, effect of war development on post-war car designs, conversion for war, requirements of fuels and lubricants in the armed forces, influence of automotive mass-production methods on war conversion, engine smoothness and protection through shear rubber mountings, diesel superchargers . . . The July issue will be the greatest, technically, in the history of SAE Journal publishing. Watch for the smashing July SAE Journal!